PATENT ABSTRACTS OF JAPAN
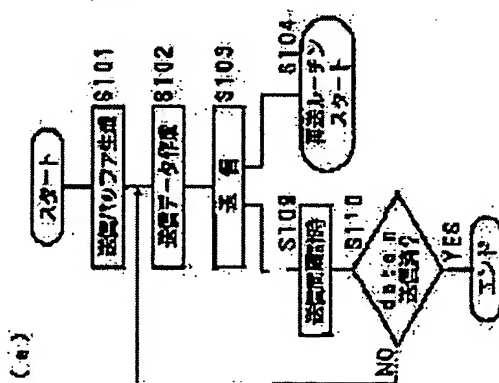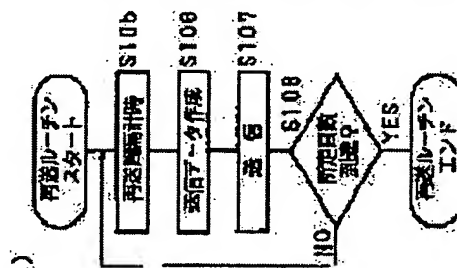
(54) BROADCAST COMMUNICATION METHOD AND DEVICE, AND RECORDING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To keep a satisfactory state of communication and to prevent the lowering of throughput in the broadcast communication by transmitting the retransmission request data from a communication device of the receiving side if the transmission data having the same information are not received even once in a normal state by the communication device of the receiving side.

SOLUTION: A retransmission routine is started (S104), a retransmission interval t1 that is previously set is calculated as a time interval when the same divided data are retransmitted (S105), the transmission data are produced to write the same divided data in the next transmitting buffer (S106) and the contents of the transmitting buffer are transmitted (S107). In these steps, data 1, i.e., the 1st divided data, are written in the 2nd transmitting buffer and then sent to plural receiving sides as packets. The retransmission request data are transmitted from a communication device of the receiving side to retransmit the transmission data if the transmission data having the same information are not received even once in a normal state by the transmission device of the receiving side.

LEGAL STATUS

[Date of request for examination]　　04.09.2001

BEST AVAILABLE COPY

| (51)Int.Cl.⁷		識別記号	FI			テーマコード（参考）
H04L	12/28		H04L	11/00	310D	5B089
G06F	13/00	355	G06F	13/00	355	5K030
H04L	12/40		H04L	11/00	320	5K032
	12/18			11/18		5K033
	12/56			11/20	102A	5K035

審査請求　未請求　請求項の数24　OL　（全12頁）　最終頁に続く

(54)【発明の名称】　同報通信方法、同報通信装置、及び記録媒体

(57)【要約】

【課題】　送信したデータに欠落が発生し難く、そのため欠落したデータの再送信等のリカバリ処理の多発により通信回線が激増するブロードキャストストームが発生し難い同報通信方法、その実施に使用する同報通信装置、及びコンピュータでの読み取りが可能な記録媒体を提供する。

【解決手段】　送信側の通信装置から、複数台の受信側の通信装置へ同じ情報を有する送信用のデータを所定個数作成の上、所定間隔で所定回数送信する。そして受信側の通信装置では、送信側が所定回数の送信の完了を検出した時点でデータの欠落等の異常を検出し、異常が検出された場合に再送信を要求する。

実施の形態1における送信側のコンピュータの
同報通信方法を示すフローチャート
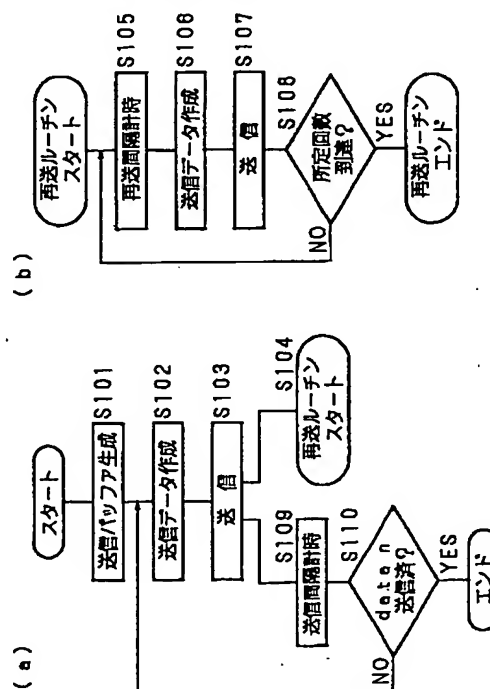
【特許請求の範囲】

【請求項1】　送信側の一台の通信装置から受信側の複数台の通信装置へ同じ内容のデータを送信し、受信側の通信装置にて正常に受信したか否かを検出し、正常に受信していないデータがある場合に、再度送信するように要求するデータを受信側の通信装置から送信する同報通信方法において、

送信側の通信装置から受信側の通信装置へ所定の時間間隔で同じ情報を有する送信データを複数回送信し、

受信側の通信装置にて同じ情報を有する送信データが、一回も正常に受信できていない場合に、再度送信するように要求する再送信要求データを受信側の通信装置から送信することを特徴とする同報通信方法。

【請求項2】　送信側の通信装置が、再送信要求データを受信したときに、送信データを送信する時間間隔を延長することを特徴とする請求項1に記載の同報通信方法。

【請求項3】　送信データを送信する時間間隔を延長することにより、送信データを送信する時間間隔が予め設定された時間より長くなったときに、再送信要求データを送信しないように送信側から受信側へ通知することを特徴とする請求項2に記載の同報通信方法。

【請求項4】　送信側の通信装置が、再送信要求データを受信したときに、同じ情報を有する送信データを送信する回数を増加させることを特徴とする請求項1乃至請求項3のいずれかに記載の同報通信方法。

【請求項5】　送信データを送信する回数を増加させることにより、送信データを送信する回数が予め設定された回数より多くなったときに、再送信要求データを送信しないように送信側から受信側へ通知することを特徴とする請求項4に記載の同報通信方法。

【請求項6】　送信側の通信装置にて、所定の時点から時間を計時し、

計時した時間が所定の基準時間に達するまでに再送信要求データを受信しなかったときに、同じ情報を有する送信データを送信する回数を低減することを特徴とする請求項1乃至請求項5のいずれかに記載の同報通信方法。

【請求項7】　送信側の通信装置にてデータを送信した回数を計数し、

送信した回数が所定の基準回数に達した場合に再送信要求データを送信しないように送信側から受信側へ通知することを特徴とする請求項1乃至請求項6のいずれかに記載の同報通信方法。

【請求項8】　第1の受信側の通信装置から複数台の通信装置へ再送信要求データを送信し、

第2の受信側の通信装置が、第1の受信側の通信装置から送信された再送信要求データを受信したときに、第1の受信側の通信装置が再送を要求している送信データと同じ送信データに対する再送信要求データを送信しないようにすることを特徴とする請求項1乃至請求項7のい

ずれかに記載の同報通信方法。

【請求項9】　複数台の受信側の通信装置へ同じ内容のデータを送信し、受信側の通信装置にて正常に受信したか否かを検出し、正常に受信していないデータがある場合に、受信側の通信装置から送信される再度送信するように要求する再送信要求データを受信する同報通信装置において、

受信側の通信装置へ所定の時間間隔で同じ情報を有する送信データを複数回送信する手段を備えることを特徴とする同報通信装置。

【請求項10】　再送信要求データを受信したときに、送信データを送信する時間間隔を延長する手段を備えることを特徴とする請求項9に記載の同報通信装置。

【請求項11】　送信データを送信する時間間隔を延長することにより、送信データを送信する時間間隔が予め設定された時間より長くなったときに、再送信要求データを送信しないように受信側へ通知する手段を備えることを特徴とする請求項10に記載の同報通信装置。

【請求項12】　再送信要求データを受信したときに、同じ情報を有する送信データを送信する回数を増加させる手段を備えることを特徴とする請求項9乃至請求項11のいずれかに記載の同報通信装置。

【請求項13】　送信データを送信する回数を増加させることにより、送信データを送信する回数が予め設定された回数より多くなったときに、再送信要求データを送信しないように受信側へ通知する手段を備えることを特徴とする請求項12に記載の同報通信装置。

【請求項14】　所定の時点から時間を計時する手段と、

計時した時間が所定の基準時間に達するまでに再送信要求データを受信しなかったときに、同じ情報を有する送信データを送信する回数を低減する手段とを備えることを特徴とする請求項9乃至請求項13のいずれかに記載の同報通信装置。

【請求項15】　データを送信した回数を計数する手段と、

送信した回数が所定の基準回数に達した場合に再送信要求データを送信しないように受信側へ通知する手段とを備えることを特徴とする請求項9乃至請求項14のいずれかに記載の同報通信装置。

【請求項16】　送信側の一台の通信装置から受信側の複数台の通信装置へ送信された送信データを正常に受信したか否かを検出し、正常に受信していない送信データがある場合に、再度送信するように要求する再送信要求データを送信する同報通信装置において、

同じ情報を有する送信データを複数回受信して一回も正常に受信できていない場合に、再送信要求データを複数の通信装置へ送信する手段と、

受信側の通信装置から送信された再送信要求データを受信したときに、受信した再送信要求データが要求してい

る送信データと同じ送信データに対する再送信要求データを送信しないようにする手段とを備えることを特徴とする同報通信装置。

【請求項１７】　コンピュータに、受信側の複数台の通信装置へ同じ内容のデータを送信させ、受信側の通信装置にて正常に受信したか否かを検出し、正常に受信していないデータがある場合に、受信側の通信装置から送信される再度送信するように要求する再送信要求データを受信させるプログラムを記録してあるコンピュータでの読み取りが可能な記録媒体において、
コンピュータに、送信先の通信装置へ所定の時間間隔で同じ情報を有する送信データを複数回送信させるプログラムコード手段を含むことを特徴とするコンピュータでの読み取りが可能な記録媒体。

【請求項１８】　コンピュータに、再送信要求データを受信したときに送信データを送信する時間間隔を延長させる手段を含むことを特徴とする請求項１７に記載のコンピュータでの読み取りが可能な記録媒体。

【請求項１９】　コンピュータに、送信データを送信する時間間隔を延長することにより、送信データを送信する時間間隔が予め設定された時間より長くなったときに、再送信要求データを送信しないように送信先へ通知させる手段を含むことを特徴とする請求項１８に記載のコンピュータでの読み取りが可能な記録媒体。

【請求項２０】　コンピュータに、再送信要求データを受信したときに、同じ情報を有する送信データを送信する回数を増加させる手段を含むことを特徴とする請求項１７乃至請求項１９のいずれかに記載のコンピュータでの読み取りが可能な記録媒体。

【請求項２１】　コンピュータに、送信データを送信する回数を増加させることにより、送信データを送信する回数が予め設定された回数より多くなったときに、再送信要求データを送信しないように送信先へ通知させる手段を含むことを特徴とする請求項２０に記載のコンピュータでの読み取りが可能な記録媒体。

【請求項２２】　コンピュータに、所定のタイミングから時間を計時させる手段と、
コンピュータに、計時した時間が基準時間に達するまでに再送信要求データを受信しなかったときに、同じ情報を有する送信データを送信する回数を低減させる手段とを含むことを特徴とする請求項１７乃至請求項２１のいずれかに記載のコンピュータでの読み取りが可能な記録媒体。

【請求項２３】　コンピュータに、データを送信した回数を計数させる手段と、
コンピュータに、送信した回数が基準回数に達した場合に再送信要求データを送信しないように送信先へ通知させる手段とを含むことを特徴とする請求項１７乃至請求項２２のいずれかに記載のコンピュータでの読み取りが可能な記録媒体。

【請求項２４】　コンピュータに、受信側の複数台の通信装置へ同じ内容のデータを送信する送信側の通信装置からデータを受信させ、正常に受信したか否かを検出させて正常に受信していないデータがある場合に、再度送信するように要求する再送信要求データを送信させるためのプログラムを記録してあるコンピュータでの読み取りが可能な記録媒体において、
コンピュータに、同じ情報を有する送信データを複数回受信して一回も正常に受信できていない場合に、再送信要求データを複数の通信装置へ送信させるプログラムコード手段と、
コンピュータに、受信側の通信装置から送信された再送信要求データを受信したときに、受信した再送信要求データが要求している送信データと同じ送信データに対する再送信要求データを送信させないようにするプログラムコード手段とを含むことを特徴とするコンピュータでの読み取りが可能な記録媒体。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は通信回線で接続された複数台の通信装置、例えば複数台のコンピュータ間、又はサーバコンピュータ（以下サーバという）と複数台のプリンタとの間でデータを送受信する同報通信方法、その方法を実施するための同報通信装置、及び同報通信のコンピュータプログラムが記録されている記録媒体に関する。

【０００２】

【従来の技術】複数台のコンピュータ及びプリンタ等の通信装置を通信回線に接続し、送信側である一台の通信装置から受信側である複数台の通信装置へ同じ内容のデータを、同時に送信する同報通信（ブロードキャストメッセージ）に用いられる通信方法は２種類に分類できる。第１の通信方法は、送信側（サーバ）から受信側（プリンタ）へデータを送信するだけの通信方法であり、第２の通信方法は、送信されたデータを保証するために受信側（プリンタ）が受信したデータに欠落等の異常がある場合、受信側（プリンタ）から再度データの送信を要求するリカバリ送信要求の処理を行う通信方法である。

【０００３】

【発明が解決しようとする課題】従来の第１の通信方法においては、データ異常時の保証が無いため、データ通信に対して十分な信頼性が得られないという問題がある。

【０００４】また、従来の第２の通信方法において、例えば各部屋に設置したプリンタへ同時に同一データを送信する場合は、多数の受信側（プリンタ）でデータの欠落等の異常が発生した場合に、夫々の受信側（プリンタ）から全ての通信装置に対してリカバリ送信要求が送られ、また、送信側（サーバ）では夫々の受信側（プリ

ンタ）からのリカバリ送信要求について、全ての通信装置に対してリカバリ送信として再送データを送信する。このため通信回線のトラフィックが激増するブロードキャストストームが発生し、正常な通信が行えない状態になるという問題、及び送信側（サーバ）の負荷のために全体としてのスループットが低下するという問題がある。特に画像等のサイズの大きいデータを送信するときには、これらの問題が顕著に現れる。

【０００５】本発明は斯かる事情に鑑みてなされたものであり、第１の目的は、所定の時間間隔で、同じ情報を有する送信用のデータを所定個数送信することによって、ブロードキャストストームの発生を抑え、良好な通信状態を維持し、スループットの低下を防止する同報通信方法、その方法を実施するための同報通信装置、及び同報通信のコンピュータプログラムが記録されている記録媒体を提供することにある。

【０００６】第２の目的は、送信側でリカバリ送信要求を受信した場合に、送信用のデータを送信する時間間隔を延長し、更にリカバリ送信要求を多数受信して、データを送信する時間間隔が予め設定された上限時間より長くなった場合に、リカバリ送信要求を送信しないようにすることによって、良好な通信状態を維持し、スループットの確保を優先する同報通信方法、その方法を実施するための同報通信装置、及び同報通信のコンピュータプログラムが記録されている記録媒体を提供することにある。

【０００７】第３の目的は、送信側でリカバリ送信要求の受信状況を確認し、同じ情報を有する送信データを送信する個数を調整し、更にリカバリ送信要求を多数受信し、同じ情報を有する送信データを送信する個数が予め設定された上限個数より多くなった場合に、リカバリ送信要求を送信しないようにすることによって、良好な通信状態を維持し、スループットの確保を優先する同報通信方法、その方法を実施するための同報通信装置、及び同報通信のコンピュータプログラムが記録されている記録媒体を提供することにある。

【０００８】第４の目的は、送信回数が基準回数に達した場合に、それ以前に受信側で受信した送信データについてのリカバリ送信を要求しないようにすることによって、スループットの確保を優先する同報通信方法、その方法を実施するための同報通信装置、及び同報通信のコンピュータプログラムが記録されている記録媒体を提供することにある。

【０００９】第５の目的は、第１の受信側の通信装置から複数台の通信装置へ送信したリカバリ送信要求を、第２の受信側の通信装置が受信した場合に、同じ送信データに対するリカバリ送信を要求しないようにすることによって、ブロードキャストストームの発生を抑える同報通信方法、その方法を実施するための同報通信装置、及び同報通信のコンピュータプログラムが記録されている

記録媒体を提供することにある。

【００１０】
【課題を解決するための手段】第１発明に係る同報通信方法は、送信側の一台の通信装置から受信側の複数台の通信装置へ同じ内容のデータを送信し、受信側の通信装置にて正常に受信したか否かを検出し、正常に受信していないデータがある場合に、再度送信するように要求するデータを受信側の通信装置から送信する同報通信方法において、送信側の通信装置から受信側の通信装置へ所定の時間間隔で同じ情報を有する送信データを複数回送信し、受信側の通信装置にて同じ情報を有する送信データが、一回も正常に受信できていない場合に、再度送信するように要求する再送信要求データを受信側の通信装置から送信することを特徴とする。

【００１１】第２発明に係る同報通信方法は、第１発明において、送信側の通信装置が、再送信要求データを受信したときに、送信データを送信する時間間隔を延長することを特徴とする。

【００１２】第３発明に係る同報通信方法は、第２発明において、送信データを送信する時間間隔を延長することにより、送信データを送信する時間間隔が予め設定された時間より長くなったときに、再送信要求データを送信しないように送信側から受信側へ通知することを特徴とする。

【００１３】第４発明に係る同報通信方法は、第１発明乃至第３発明のいずれかにおいて、送信側の通信装置が、再送信要求データを受信したときに、同じ情報を有する送信データを送信する回数を増加させることを特徴とする。

【００１４】第５発明に係る同報通信方法は、第４発明において、送信データを送信する回数を増加させることにより、送信データを送信する回数が予め設定された回数より多くなったときに、再送信要求データを送信しないように送信側から受信側へ通知することを特徴とする。

【００１５】第６発明に係る同報通信方法は、第１発明乃至第５発明のいずれかにおいて、送信側の通信装置にて、所定の時点から時間を計時し、計時した時間が所定の基準時間に達するまでに再送信要求データを受信しなかったときに、同じ情報を有する送信データを送信する回数を低減することを特徴とする。

【００１６】第７発明に係る同報通信方法は、第１発明乃至第６発明のいずれかにおいて、送信側の通信装置にてデータを送信した回数を計数し、送信した回数が所定の基準回数に達した場合に再送信要求データを送信しないように送信側から受信側へ通知することを特徴とする。

【００１７】第８発明に係る同報通信方法は、第１発明乃至第７発明のいずれかにおいて、第１の受信側の通信装置から複数台の通信装置へ再送信要求データを送信

7

し、第2の受信側の通信装置が、第1の受信側の通信装置から送信された再送信要求データを受信したときに、第1の受信側の通信装置が再送を要求している送信データと同じ送信データに対する再送信要求データを送信しないようにすることを特徴とする。

【００１８】第9発明に係る同報通信装置は、複数台の受信側の通信装置へ同じ内容のデータを送信し、受信側の通信装置にて正常に受信したか否かを検出し、正常に受信していないデータがある場合に、受信側の通信装置から送信される再度送信するように要求する再送信要求データを受信する同報通信装置において、受信側の通信装置へ所定の時間間隔で同じ情報を有する送信データを複数回送信する手段を備えることを特徴とする。

【００１９】第１０発明に係る同報通信装置は、第9発明において、再送信要求データを受信したときに、送信データを送信する時間間隔を延長する手段を備えることを特徴とする。

【００２０】第１１発明に係る同報通信装置は、第１０発明において、送信データを送信する時間間隔を延長することにより、送信データを送信する時間間隔が予め設定された時間より長くなったときに、再送信要求データを送信しないように受信側へ通知する手段を備えることを特徴とする。

【００２１】第１２発明に係る同報通信装置は、第9発明乃至第１１発明のいずれかにおいて、再送信要求データを受信したときに、同じ情報を有する送信データを送信する回数を増加させる手段を備えることを特徴とする。

【００２２】第１３発明に係る同報通信装置は、第１２発明において、送信データを送信する回数を増加させることにより、送信データを送信する回数が予め設定された回数より多くなったときに、再送信要求データを送信しないように受信側へ通知する手段を備えることを特徴とする。

【００２３】第１４発明に係る同報通信装置は、第9発明乃至第１３発明のいずれかにおいて、所定の時点から時間を計時する手段と、計時した時間が所定の基準時間に達するまでに再送信要求データを受信しなかったときに、同じ情報を有する送信データを送信する回数を低減する手段とを備えることを特徴とする。

【００２４】第１５発明に係る同報通信装置は、第9発明乃至第１４発明のいずれかにおいて、データを送信した回数を計数する手段と、送信した回数が所定の基準回数に達した場合に再送信要求データを送信しないように受信側へ通知する手段とを備えることを特徴とする。

【００２５】第１６発明に係る同報通信装置は、送信側の一台の通信装置から受信側の複数台の通信装置へ送信された送信データを正常に受信したか否かを検出し、正常に受信していない送信データがある場合に、再度送信するように要求する再送信要求データを送信する同報通

8

信装置において、同じ情報を有する送信データを複数回受信して一回も正常に受信できていない場合に、再送信要求データを複数の通信装置へ送信する手段と、受信側の通信装置から送信された再送信要求データを受信したときに、受信した再送信要求データが要求している送信データと同じ送信データに対する再送信要求データを送信しないようにする手段とを備えることを特徴とする。

【００２６】第１７発明に係るコンピュータでの読み取りが可能な記録媒体は、コンピュータに、受信側の複数台の通信装置へ同じ内容のデータを送信させ、受信側の通信装置にて正常に受信したか否かを検出し、正常に受信していないデータがある場合に、受信側の通信装置から送信される再度送信するように要求する再送信要求データを受信させるプログラムを記録してあるコンピュータでの読み取りが可能な記録媒体において、コンピュータに、送信先の通信装置へ所定の時間間隔で同じ情報を有する送信データを複数回送信させるプログラムコード手段を含むことを特徴とする。

【００２７】第１８発明に係るコンピュータでの読み取りが可能な記録媒体は、第１７発明において、コンピュータに、再送信要求データを受信したときに送信データを送信する時間間隔を延長させる手段を含むことを特徴とする。

【００２８】第１９発明に係るコンピュータでの読み取りが可能な記録媒体は、第１８発明において、コンピュータに、送信データを送信する時間間隔を延長することにより、送信データを送信する時間間隔が予め設定された時間より長くなったときに、再送信要求データを送信しないように送信先へ通知させる手段を含むことを特徴とする。

【００２９】第２０発明に係るコンピュータでの読み取りが可能な記録媒体は、第１７発明乃至第１９発明のいずれかにおいて、コンピュータに、再送信要求データを受信したときに、同じ情報を有する送信データを送信する回数を増加させる手段を含むことを特徴とする。

【００３０】第２１発明に係るコンピュータでの読み取りが可能な記録媒体は、第２０発明において、コンピュータに、送信データを送信する回数を増加させることにより、送信データを送信する回数が予め設定された回数より多くなったときに、再送信要求データを送信しないように送信先へ通知させる手段を含むことを特徴とする。

【００３１】第２２発明に係るコンピュータでの読み取りが可能な記録媒体は、第１７発明乃至第２１発明のいずれかにおいて、コンピュータに、所定のタイミングから時間を計時させる手段と、コンピュータに、計時した時間が基準時間に達するまでに再送信要求データを受信しなかったときに、同じ情報を有する送信データを送信する回数を低減させる手段とを含むことを特徴とする。

【００３２】第２３発明に係るコンピュータでの読み取

９

りが可能な記録媒体は、第１７発明乃至第２２発明のいずれかにおいて、コンピュータに、データを送信した回数を計数させる手段と、コンピュータに、送信した回数が基準回数に達した場合に再送信要求データを送信しないように送信先へ通知させる手段とを含むことを特徴とする。

【００３３】第２４発明に係るコンピュータでの読み取りが可能な記録媒体は、コンピュータに、受信側の複数台の通信装置へ同じ内容のデータを送信する送信側の通信装置からデータを受信させ、正常に受信したか否かを検出させて正常に受信していないデータがある場合に、再度送信するように要求する再送信要求データを送信させるためのプログラムを記録してあるコンピュータでの読み取りが可能な記録媒体において、コンピュータに、同じ情報を有する送信データを複数回受信して一回も正常に受信できていない場合に、再送信要求データを複数の通信装置へ送信させるプログラムコード手段と、コンピュータに、受信側の通信装置から送信された再送信要求データを受信したときに、受信した再送信要求データが要求している送信データと同じ送信データに対する再送信要求データを送信させないようにするプログラムコード手段とを含むことを特徴とする。

【００３４】本発明は複数台のコンピュータ及びプリンタ等の通信装置を通信回線に接続した環境で実施されるデータを送受信する同報通信方法、その方法の実施に使用する同報通信装置、及びコンピュータをして他の通信装置とデータを送受信せしめるプログラムが記録されてある記録媒体である。

【００３５】第１、第９、及び第１７発明では、所定の時間間隔で同じ情報を有する送信用のデータを所定回数送信することによって、受信側が受信したデータのいずれかが正常なデータであれば良い。これにより良好な通信状態を維持するという目的を達成することができる。

【００３６】第２、第３、第１０、第１１、第１８、及び第１９発明では、送信側でリカバリ送信要求を受信した場合に、送信用のデータを送信する間隔を長くすることによって、短い時間に通信が集中し、通信状態が良好でない状態になることを防止できる。更には通信状態が悪くリカバリ送信要求を多数受信し、データを送信する間隔が予め設定された時間間隔より長くなった場合に、リカバリ送信要求を送信しないようにして、ブロードキャストストームの発生を抑え、スループットの確保を優先することができる。

【００３７】第４、第５、第１２、第１３、第２０、及び第２１発明では、送信側でリカバリ送信要求を受信した場合に、同じ情報を有する送信データの送信回数を増やすことによって、受信側が全てのデータを正常に受信できない可能性を更に下げて、リカバリ送信の必要性を抑え、通信状態が良好でない状態になることを防止できる。更には通信状態が悪くリカバリ送信要求を多数受信

１０

し、同じ情報を有する送信データの送信回数が予め設定された回数より多くなった場合に、リカバリ送信要求を送信しないようにして、ブロードキャストストームの発生を抑え、スループットの確保を優先することができる。

【００３８】第６、第１４、及び第２２発明では、送信側でリカバリ送信要求を基準時間以上、受信しなかった場合に、同じ情報を有する送信データの送信回数を減らすことによって、通信回線のトラフィックが混雑することを防止できる。

【００３９】第７、第１５、及び第２３発明では、送信回数が基準回数に達した場合に、それ以前に受信側で受信した送信データについてのリカバリ送信を要求しないようにすることによって、スループットの確保を優先することができる。

【００４０】第８、第１６、及び第２４発明では、受信側である通信装置が、他の受信側である通信装置から送られたリカバリ送信要求を受けた場合に、同じ送信データに対するリカバリ送信を要求しないようにすることによって、ブロードキャストストームの発生を抑えることができる。

【００４１】
【発明の実施の形態】実施の形態１．以下、本発明をその実施の形態を示す図面に基づいて詳述する。図１は本発明の同報通信装置を用いた実施の形態を示すブロック図である。図中１，１…は通信装置として用いるコンピュータであり、コンピュータ１，１…はＣＰＵ２を有し、ＣＰＵ２にはＣＰＵ２において発生するデータを記憶するＲＡＭ３、本発明のプログラムを記録してあるＣＤ－ＲＯＭ及びフレキシブルディスク等の記録媒体１０から本発明のプログラムを読み取るＣＤ－ＲＯＭドライブ及びフレキシブルディスクドライブ等の外部記憶装置４、外部記憶装置４により読み取った本発明のプログラムを格納するハードディスク等の記録装置５、時間を計時する計時装置６、外部とデータの送受信を行う通信インターフェース７、キーボード及びマウス等の入力装置８、並びにモニタ及びプリンタ等の出力装置９が接続されている。そしてコンピュータ１，１…は、通信インターフェース７により通信回線１１に接続されている。更に通信回線１１はルータ等の接続装置１２によりインターネット等の外部ネットワーク回線１３に接続されている。

【００４２】本発明のプログラムは記録媒体１０から読み取る以外にも、外部ネットワーク回線１３を介して外部サーバコンピュータ１４に接続し、外部サーバコンピュータ１４に内蔵された本発明のプログラムを記録してある記録媒体１５からコンピュータ１へ本発明のプログラムをダウンロードすることにより記録装置５に格納することができる。

【００４３】次に本発明の同報通信方法を説明する。図

２（ａ）、（ｂ）、及び図４は本発明における送信側の
コンピュータの同報通信方法を示すフローチャート、並
びに図３は本発明における受信側のコンピュータの同報
通信方法のフローチャートである。送信側の通信装置で
あるコンピュータにおいて、送信するデータである元デ
ータをＲＡＭ３上の連続したアドレスの領域に読み込
み、そして元データをｎ個に分割した分割データをｍ回
送信するために、パケットとして送信する送信データを
書き込む送信バッファをｍ個生成する（ステップＳ１０
１）。

【００４４】送信バッファに、同一の分割データの何回
目の送信かを示す送信回数データ、送信データの属性を
示す属性データ、送信する分割データが読み込まれてい
るアドレスを示すアドレスデータ、及び分割データの内
容等の情報を書き込む送信データ作成処理を行う（ステ
ップＳ１０２）。最初の段階では１番目の分割データで
あるdata1が１回目の送信用の送信バッファに書き込ま
れる。　そして、送信する送信データを書き込んだ送信
バッファの内容をパケットとして受信側の複数の通信装
置へ同時に送信する（ステップＳ１０３）。

【００４５】再送ルーチンを起動して（ステップＳ１０
４）、同一の分割データを再送する時間間隔として予め
設定されてある再送間隔ｔ１を計時し（ステップＳ１０
５）、同一の分割データを次の送信用の送信バッファに
書き込む送信データ作成処理を行い（ステップＳ１０
６）、送信バッファの内容を送信する（ステップＳ１０
７）。この段階では１番目の分割データであるdata1が
２回目の送信用の送信バッファに書き込まれて、複数の
受信側へパケットとして送信される。ステップＳ１０５
〜Ｓ１０７の処理を（ｍ−１）回繰り返すことにより
（ステップＳ１０６）、同一の分割データをｍ個作成し
ｔ１の間隔でｍ回送信することになる。

【００４６】また、ステップＳ１０３においてdata1が
送信された後、夫々の分割データを送信する時間間隔と
して予め設定されてある送信間隔ｔ２を計時し（ステッ
プＳ１０９）、ステップＳ１０２，Ｓ１０３、及びＳ１
０４の処理を最後の分割データであるdatanを送信する
まで繰り返すことにより（ステップＳ１１０）、分割デ
ータであるdata1，data2，…，datanの１回目の送信
をｔ２の間隔で行う。そして、data2〜datanについて
もステップＳ１０５〜Ｓ１０８の再送ルーチンにより、
ｍ個作成して複数の受信側へｔ１の間隔でｍ回送信す
る。なおｔ１及びｔ２を調整することにより、分割デー
タの再送及び送信に要する時間及び送信順序を任意に変
更することができる。

【００４７】受信側の通信装置であるコンピュータで
は、パケットを受信し（ステップＳ１２１）、パケット
の属性データを判別することにより、受信したパケット
が送信側から送信されたパケットであることが判明した
場合、受信したパケットに書き込まれている情報を基

に、分割データから元データを復元するデータ復元処理
を行い（ステップＳ１２２）、受信したパケットのアド
レスデータをアドレス情報として保管する。

【００４８】また、受信したパケットの属性データが、
リカバリ送信要求拒否を示すデータであった場合（ステ
ップＳ１２３）、アドレス情報を検索して受信した分割
データのアドレスの連続状態を検出し、連続していない
箇所があるときには、連続していない箇所にダミーデー
タを書き込むことで、当該パケット以前に受信した分割
データのリカバリ送信要求を送信しないようにするリカ
バリ送信要求禁止処理を行う（ステップＳ１２４）。

【００４９】そして、受信したパケットに書き込まれて
いる送信回数データを判別し、受信したパケットが同一
の分割データの最終送信であることが判明した場合（ス
テップＳ１２５）、アドレス情報を検索して受信した分
割データのアドレスの連続状態を検出し、連続していな
い箇所があるときには（ステップＳ１２６）、連続して
いない箇所の分割データの再送信を要求するリカバリ送
信要求を生成し、パケットとして送信する（ステップＳ
１２７）。このとき生成されるリカバリ送信要求は送信
データと同様のフォーマットであり、属性データにリカ
バリ送信要求であることを示す符号、そしてアドレスデ
ータにリカバリ送信を要求する分割データのアドレスが
書き込まれている。

【００５０】このようにステップＳ１２１〜Ｓ１２８の
処理を繰り返してデータ復元処理を行う。ただし、同一
の分割データが書き込まれたパケットを複数回受信した
場合は、復元しているデータの該当部分を、後で受信し
たデータの内容に更新する。

【００５１】そして最後の分割データであるdatanが書
き込まれたパケットを受信した場合（ステップＳ１２
８）、全てのパケットの受信が完了したと判断し受信処
理を終了させる。なおdata1及びdatanは送信側におい
て属性データに１番目の分割データ又は最終データであ
ることを示す符号を書き込むことにより、受信側に１番
目の分割データ又は最終データであることを認識させる
ことができる。

【００５２】送信側では、パケットを受信し、パケット
の属性データを判別することにより、受信したパケット
が受信側から送信されたリカバリ送信要求であることが
判明した場合、パケットとして送信するリカバリ送信デ
ータを書き込むリカバリ送信バッファを１個生成し（ス
テップＳ１３１）、生成したリカバリ送信バッファにリ
カバリ送信データを書き込む（ステップＳ１３２）。リ
カバリ送信データは、受信したリカバリ送信要求の内容
に基づいたもので、送信データと同様のフォーマットで
あり、属性データにリカバリ送信データであることを示
す符号、アドレスデータにリカバリ送信する分割データ
のアドレス、そしてリカバリ送信する分割データの内容
を書き込むものである。

13

【００５３】そして、リカバリ送信するリカバリ送信データを書き込んだリカバリ送信バッファの内容をパケットして受信側へ１回送信する（ステップＳ１３３）。なお、これらのリカバリ送信に関する処理はステップＳ１０１～Ｓ１１０で示される通常の送信より優先される。

【００５４】上述のように本発明の同報通信方法は、送信側からは同一のデータをｍ回送信し、受信側では同一のデータを有するパケットを一回も正常に受信できなかった場合にリカバリ送信の要求を行う方法である。

【００５５】また本発明の同報通信方法は、上述のようにコンピュータ間における通信だけでなく送信装置であるサーバから受信装置である複数のプリンタへ印刷用データを送信する場合においても実施することができる。

【００５６】実施の形態２．図５は本発明の実施の形態２における同報通信方法を説明する送信側のコンピュータの同報通信方法を示すフローチャートである。実施の形態２は、実施の形態１における送信側のプログラムを一部変更したものであり、送信側の通信装置であるコンピュータがリカバリ送信要求を受信する都度（ステップＳ２０１）、再送間隔ｔ１を予め設定された延長時間分延長してＴ１とし（ステップＳ２０２）、短時間に送信が集中しないようにするものである。更にリカバリ送信要求の受信が多発し、Ｔ１が予め設定された上限時間より長くなったときには（ステップＳ２０３）、次に送信側から送信するパケットの属性データにリカバリ送信要求拒否を示す符号を書き込む処理を行い（ステップＳ２０４）、受信側の通信装置として用いるコンピュータがリカバリ送信要求を送信しないようにした同報通信方法である。なお再送間隔ｔ１ではなく、送信間隔ｔ２を延長しても良い。

【００５７】その他の要部構成及び動作は、上述の実施の形態１で説明した同報通信方法の要部構成及び動作と同じであるので説明を省略する。

【００５８】実施の形態３．図６は本発明の実施の形態３における同報通信方法を説明する送信側のコンピュータの同報通信方法を示すフローチャートである。実施の形態３は、実施の形態１における送信側のプログラムを一部変更したものであり、送信側の通信装置であるコンピュータがリカバリ送信要求を受信する都度（ステップＳ３０１）、同一の分割データを再送信する回数ｍを予め設定された増加回数分増加させてＭとし（ステップＳ３０２）、受信側通信装置として用いるコンピュータにおいて同一の分割データを有するパケットが全て正常に受信できない可能性を更に下げるようにしたものである。また、リカバリ送信要求の受信が多発し、Ｍが予め設定された上限回数より多くなったときには（ステップＳ３０３）、次に送信側から送信するパケットの属性データにリカバリ送信要求拒否を示す符号を書き込む処理を行い（ステップＳ３０４）、受信側がリカバリ送信要求を送信しないようにした同報通信方法である。

14

【００５９】なお実施の形態２と実施の形態３とを複合して、Ｔ１×Ｍに対する上限値を設定し、この上限値を超えた場合に、次に送信側から送信するパケットの属性データにリカバリ送信要求拒否を示す符号を書き込む処理を行うようにしても良く、これにより実施の形態２又は実施の形態３と同様の効果を得ることができる。

【００６０】その他の要部構成及び動作は、上述の実施の形態１で説明した同報通信方法の要部構成及び動作と同じであるので説明を省略する。

【００６１】実施の形態４．図７は本発明の実施の形態４における同報通信方法を説明する送信側のコンピュータの同報通信方法を示すフローチャートである。実施の形態４は、実施の形態１における送信側のプログラムを一部変更したものであり、送信側の通信装置であるコンピュータにおいて、送信開始時から所定の監視時間ｔ３を計時する（ステップＳ４０１）。そしてｔ３の計時が完了するまでに（ステップＳ４０３）、送信側がリカバリ送信要求を受信しない場合（ステップＳ４０２）、同一の分割データを再送信する回数ｍを予め設定された低減回数分低減してｍ１とし（ステップＳ４０４）、不要な送信を抑制する同報通信方法である。ただし、ｍ１は予め設定された下限回数以下には低減しないようにする。

【００６２】その他の要部構成及び動作は、上述の実施の形態１で説明した同報通信方法の要部構成及び動作と同じであるので説明を省略する。

【００６３】実施の形態５．図８は本発明の実施の形態５における同報通信方法を説明する送信側のコンピュータの同報通信方法を示すフローチャートである。実施の形態５は、実施の形態１における送信側のプログラムを一部変更したものであり、送信側の通信装置であるコンピュータにおいて、送信回数カウンタを設けて、パケットを送信した回数を計数し（ステップＳ５０１）、送信回数が所定の回数に達する都度、次に送信側から送信するパケットの属性データにリカバリ送信要求拒否を示す符号を書き込む処理を行い（ステップＳ５０２）、受信側の通信装置として用いるコンピュータがリカバリ送信要求を送信しないようにした同期通信方法である。

【００６４】その他の要部構成及び動作は、上述の実施の形態１で説明した同報通信方法の要部構成及び動作と同じであるので説明を省略する。

【００６５】実施の形態６．図９（ａ）及び（ｂ）は本発明の実施の形態６における同報通信方法を説明する受信側のコンピュータの同報通信方法を示すフローチャートである。実施の形態６は、実施の形態１における受信側のプログラムを一部変更したものであり、受信側の通信装置であるコンピュータがパケットを受信した場合、受信したパケットの属性データを判別し、受信したパケットは他の受信側の通信装置から送信されたリカバリ送信要求であることが判明したとき、リカバリ送信を要求

15

されている分割データのアドレスを欠落アドレス受信情報として記憶する（ステップＳ６０１）。

【００６６】そして実施の形態１のステップＳ１２８において、アドレス情報を検索して受信した分割データのアドレスの連続状態を検出し、連続していない箇所があるときには、アドレス情報の不連続箇所のアドレスと、欠落アドレス受信情報として記憶しているアドレスとを比較し（ステップＳ６０２）、アドレス情報の不連続箇所のアドレスが、欠落アドレス受信情報として記憶しているアドレスに含まれていない場合はリカバリ送信要求を送信し（ステップＳ６０３）、含まれている場合はリカバリ送信要求を送信しないようにした同期通信方法である。なお属性データにリカバリ送信要求拒否を示す符号が書き込まれているパケットを受信したときには欠落アドレス受信情報を消去する。

【００６７】その他の要部構成及び動作は、上述の実施の形態１で説明した要部構成及び動作と同じであるので説明を省略する。

【００６８】

【発明の効果】以上詳述した如く本発明では、所定の時間間隔で同じ情報を有する送信用のデータを所定回数送信することによって、受信側が受信したデータのいずれかが正常なデータであれば良く、そのためデータの欠落等の異常により正常なデータが得られないという可能性が低く、異常が発生したデータを再度送信するリカバリ送信を要求する頻度も低くなり、ブロードキャストストームが発生しにくいので、良好な通信状態を維持できスループットの低下を防止することができる等、優れた効果を奏する。

【００６９】また、本発明では、送信側でリカバリ送信要求を受信した場合に、送信用のデータを送信する間隔を長くすることによって、短い時間に通信が集中し、通信状態が良好でない状態になることを防止できる。更には通信状態が悪くリカバリ送信要求を多数受信し、データを送信する間隔が予め設定された時間間隔より長くなった場合に、リカバリ送信要求を送信しないようにして、ブロードキャストストームの発生を抑え、スループットの確保を優先することができる等、優れた効果を奏する。

【００７０】さらに、本発明では、送信側でリカバリ送信要求を受信した場合に、同じ情報を有する送信データの送信回数を増やすことによって、受信側においてデータを全て正常な状態で受信できない可能性を更に下げて、リカバリ送信の必要性を抑え、通信状態が良好でない状態になることを防止できる。更には通信状態が悪くリカバリ送信要求を多数受信し、同じ情報を有する送信データの送信回数が予め設定された回数より多くなった場合に、リカバリ送信要求を送信しないようにして、ブロードキャストストームの発生を抑え、スループットの確保を優先することができる等、優れた効果を奏する。

16

【００７１】さらに、本発明では、送信側でリカバリ送信要求を基準時間以上、受信しなかった場合に、同じ情報を有する送信データの送信回数を減らすことによって、通信回線のトラフィックが混雑することを防止できる等、優れた効果を奏する。

【００７２】さらに、本発明では、送信回数が基準回数に達した場合に、それ以前に受信側で受信した送信データについてのリカバリ送信を要求しないようにすることによって、スループットの確保を優先することができる等、優れた効果を奏する。

【００７３】さらに、本発明では、受信側である通信装置が、他の受信側である通信装置から送られたリカバリ送信要求を受けた場合に、同じ送信データに対するリカバリ送信を要求しないようにすることによって、ブロードキャストストームの発生を抑えることができる等、優れた効果を奏する。

【図面の簡単な説明】

【図１】本発明の同報通信装置を用いた実施の形態を説明するブロック図である。

【図２】実施の形態１における送信側のコンピュータの同報通信方法を示すフローチャートである。

【図３】実施の形態１における受信側のコンピュータの同報通信方法を示すフローチャートである。

【図４】実施の形態１における送信側のコンピュータの同報通信方法を示すフローチャートである。

【図５】実施の形態２における送信側のコンピュータの同報通信方法を示すフローチャートである。

【図６】実施の形態３における送信側のコンピュータの同報通信方法を示すフローチャートである。

【図７】実施の形態４における送信側のコンピュータの同報通信方法を示すフローチャートである。

【図８】実施の形態５における送信側のコンピュータの同報通信方法を示すフローチャートである。
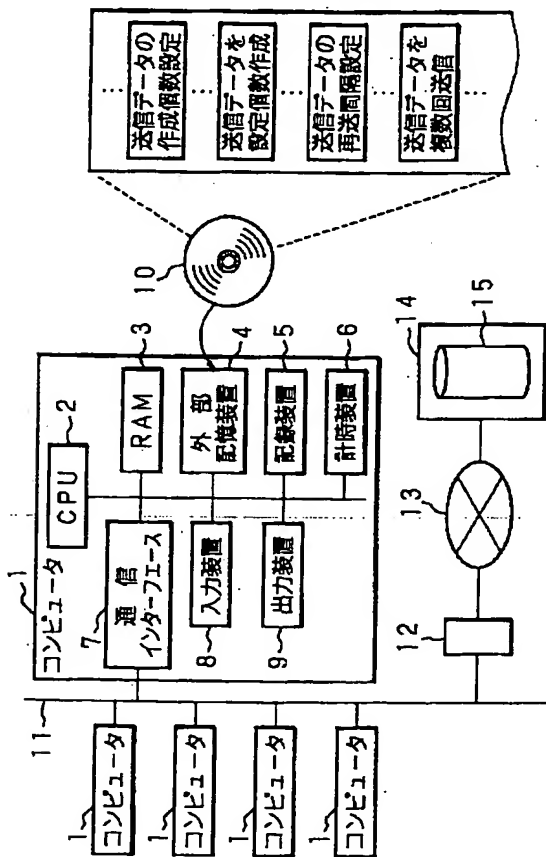
【図９】実施の形態６における受信側のコンピュータの同報通信方法を示すフローチャートである。

【符号の説明】
1　コンピュータ
2　ＣＰＵ
3　ＲＡＭ
4　外部記憶装置
5　記録装置
6　計時装置
7　通信インターフェース
8　入力装置
9　出力装置
10　記録媒体
11　通信回線
12　接続装置
13　外部ネットワーク回線
14　外部サーバコンピュータ

15　　記録媒体

【図1】

本発明の同報通信装置を用いた実施の形態を説明するブロック図

【図2】

実施の形態1における送信側のコンピュータの
同報通信方法を示すフローチャート
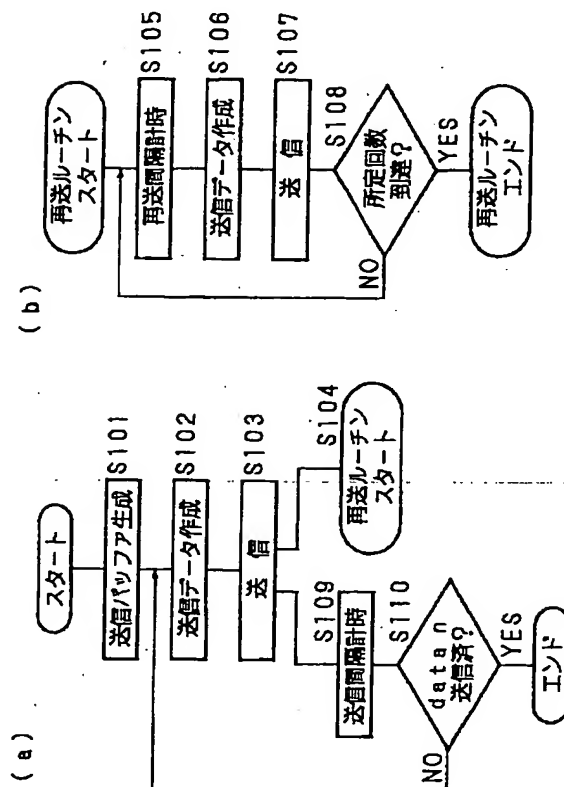
【図4】

実施の形態1における送信側のコンピュータの
同報通信方法を示すフローチャート
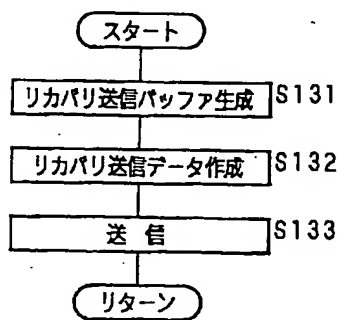
スタート

リカバリ送信バッファ生成　S131

リカバリ送信データ作成　S132

送信　S133

リターン

【図5】

実施の形態2における送信側のコンピュータの
同報通信方法を示すフローチャート

スタート

リカバリ送信要求受信　S201

再送間隔延長　S202

S203
再送間隔＞上限時間？　NO

YES

リカバリ送信要求拒否処理　S204

リターン

【図6】

実施の形態3における送信側のコンピュータの
同報通信方法を示すフローチャート

スタート

リカバリ送信要求受信　S301

再送回数増加　S302

S303
再送回数＞上限回数？　NO

YES

リカバリ送信要求拒否処理　S304

リターン

【 図3 】

実施の形態1における受信側のコンピュータの
同報通信方法を示すフローチャート

```
        ┌ スタート ┐
            │
      ┌─────────┐
      │ パケット受信 │ S121
      └─────────┘
            │
      ┌─────────┐
      │ データ復元処理 │ S122
      └─────────┘
            │
         S123
       ◇リカバリ      YES    ┌──────────┐ S124
        送信要求拒否 ────→│ リカバリ送信要求 │
         ？               │  禁止処理    │
         NO               └──────────┘
            │
         S125
    NO  ◇同一データの
   ←────  最終送信？◇
         │YES S126
       ◇アドレス      YES   ┌──────────┐ S127
        不連続？ ────────→│ リカバリ送信要求 │
         NO               └──────────┘
            │ S128
    NO  ◇ data n？◇
   ←────
         │YES
        ┌ エンド ┐
```

【 図7 】

実施の形態4における送信側のコンピュータの
同報通信方法を示すフローチャート

```
        ┌ スタート ┐
            │
      ┌─────────┐
      │ 監視時間計時開始 │ S401
      └─────────┘
            │ S402
       ◇リカバリ送信要求受信  YES
         ？ ──────────────→
         NO
            │ S403
    NO  ◇監視時間計時完了？◇
   ←────
         │YES
      ┌─────────┐
      │ 再送回数低減 │ S404
      └─────────┘
            │
        ┌ リターン ┐
```

【 図9 】

実施の形態6における受信側のコンピュータの
同報通信方法を示すフローチャート

（a）
```
        ┌ スタート ┐
            │
      ┌──────────┐
      │ 欠落アドレス受信情報記憶 │ S601
      └──────────┘
            │
        ┌ リターン ┐
```

【 図8 】

実施の形態5における送信側のコンピュータの
同報通信方法を示すフローチャート

```
        ┌ スタート ┐
            │
      ┌─────────┐
      │ 送信回数計数 │ S501
      └─────────┘
            │
      ┌──────────┐
      │ リカバリ送信要求拒否処理 │ S502
      └──────────┘
            │
        ┌ リターン ┐
```

（b）
```
        ┌ スタート ┐
            │ S602
       ◇アドレス情報の
        不連続個所のアドレス
        ⊂              YES
        欠落アドレス受信情報の ──→
        アドレス？
         NO
      ┌─────────┐
      │ リカバリ送信要求 │ S603
      └─────────┘
            │
        ┌ リターン ┐
```
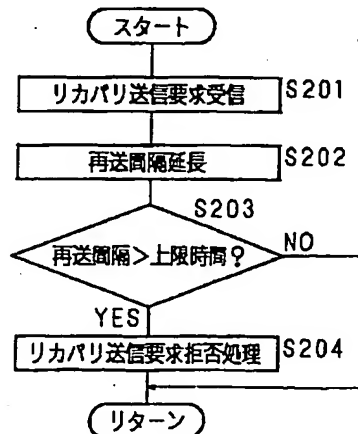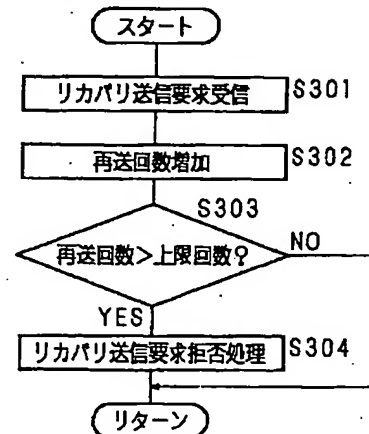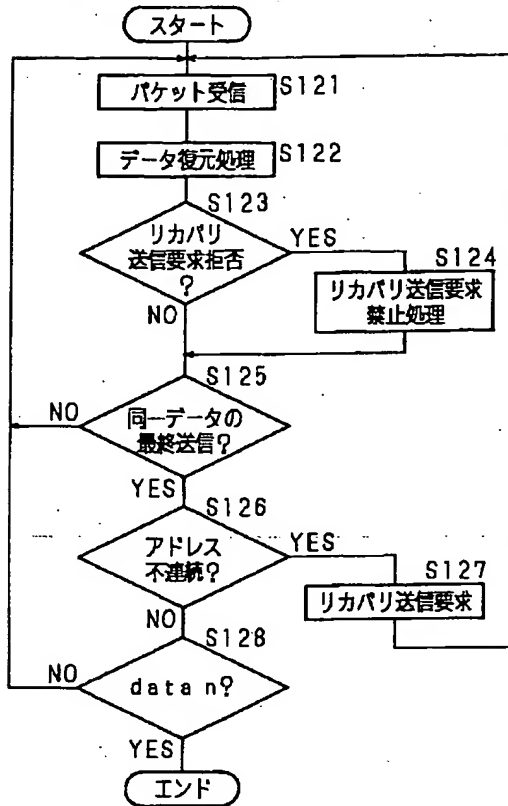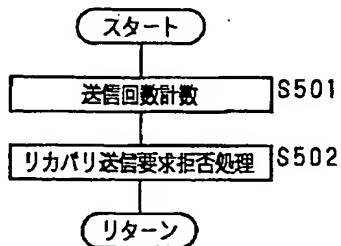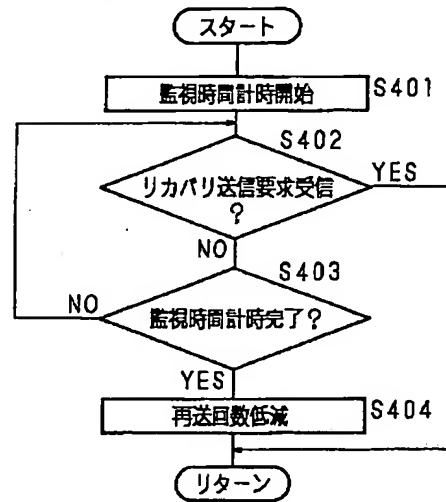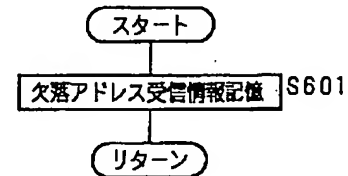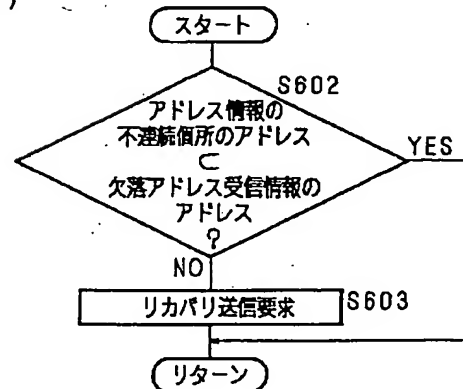
(72)発明者　藤原　隆次
　　　　　兵庫県加東郡社町佐保35番（番地なし）
　　　　　富士通周辺機株式会社内
(72)発明者　大西　良和
　　　　　兵庫県加東郡社町佐保35番（番地なし）
　　　　　富士通周辺機株式会社内
(72)発明者　藤原　伸生子
　　　　　兵庫県加東郡社町佐保35番（番地なし）
　　　　　富士通周辺機株式会社内
(72)発明者　長野　紀子
　　　　　兵庫県加東郡社町佐保35番（番地なし）
　　　　　富士通周辺機株式会社内

(72)発明者　多嘉良　崇江
　　　　　兵庫県加東郡社町佐保35番（番地なし）
　　　　　富士通周辺機株式会社内
(72)発明者　梶原　純
　　　　　兵庫県加東郡社町佐保35番（番地なし）
　　　　　富士通周辺機株式会社内

Ｆターム(参考)　5B089　GA01　GA11　GA21　JA33　JB16
　　　　　　　　　　　　KA12　KB11　KE07　KF02　ME08
　　　　　　　　　5K030　GA03　HC01　HD06　JA05　JT02
　　　　　　　　　　　　JT06　LA01　LA19　LB15　LD04
　　　　　　　　　　　　MB10
　　　　　　　　　5K032　AA01　AA07　CC04　CC05　CC10
　　　　　　　　　　　　DB19　DB22　DB24
　　　　　　　　　5K033　AA01　AA07　CB03　CB06　CB13
　　　　　　　　　　　　DB12　DB14　DB16
　　　　　　　　　5K035　AA01　AA03　BB02　CC01　CC03

PATENT ABSTRACTS OF JAPAN
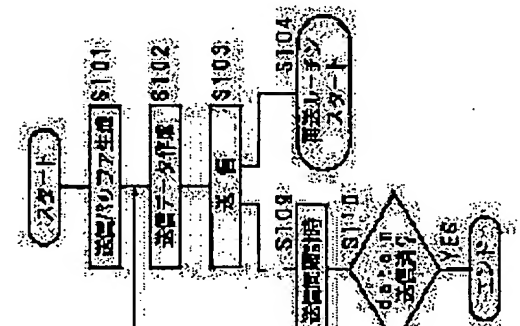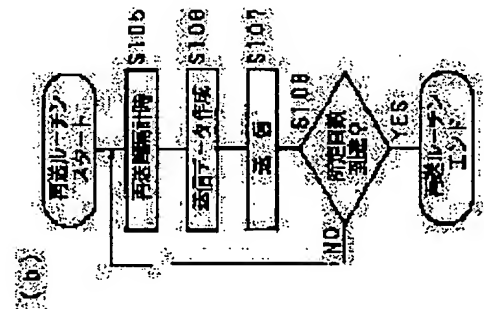
(54) BROADCAST COMMUNICATION METHOD AND DEVICE, AND RECORDING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To keep a satisfactory state of communication and to prevent the lowering of throughput in the broadcast communication by transmitting the retransmission request data from a communication device of the receiving side if the transmission data having the same information are not received even once in a normal state by the communication device of the receiving side.

SOLUTION: A retransmission routine is started (S104), a retransmission interval t1 that is previously set is calculated as a time interval when the same divided data are retransmitted (S105), the transmission data are produced to write the same divided data in the next transmitting buffer (S106) and the contents of the transmitting

buffer are transmitted (S107). In these steps, data 1, i.e., the 1st divided data, are written in the 2nd transmitting buffer and then sent to plural receiving sides as packets. The retransmission request data are transmitted from a communication device of the receiving side to retransmit the transmission data if the transmission data having the same information are not received even once in a normal state by the transmission device of the receiving side.

LEGAL STATUS

[Date of request for examination] 04.09.2001

[Date of sending the examiner's decision of rejection] 27.01.2004

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

2000 - 106559

CLAIMS

[Claim(s)]
[Claim 1] The data of the same contents are transmitted to two or more communication devices of a receiving side from one communication device of a transmitting side. In the broadcast approach of transmitting the data required as transmitting again when there are data which detect whether it having received normally and have not been normally received with the communication device of a receiving side from the communication device of a receiving side Multiple-times transmission of the transmit data which has the same information from the communication device of a transmitting side with a predetermined time interval to the communication device of a receiving side is carried out. The broadcast approach characterized by transmitting the retransmission-of-message requested data required as transmitting again from the communication device of a receiving side when the transmit data which has the same information with the communication device of a receiving side has not received normally once.
[Claim 2] The broadcast approach according to claim 1 characterized by extending the time interval which transmits transmit data when the communication device of a transmitting side receives retransmission-of-message requested data.
[Claim 3] The broadcast approach according to claim 2 characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side when the time interval which transmits transmit data by extending the time interval which transmits transmit data becomes longer than the time amount set up beforehand.
[Claim 4] The broadcast approach according to claim 1 to 3 characterized by making the count which transmits the transmit data which has the same information increase when the communication device of a transmitting side receives retransmission-of-message requested data.
[Claim 5] The broadcast approach according to claim 4 characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side when the count which transmits transmit data by making the count which transmits transmit data increase increases more than the count set up beforehand.
[Claim 6] The broadcast approach according to claim 1 to 5 characterized by reducing the count which transmits the transmit data which has the same information when retransmission-of-message requested data is not received, by the time the time amount which clocked and clocked time amount from the predetermined time with the communication device of a transmitting side reaches the predetermined conventional time.
[Claim 7] The broadcast approach according to claim 1 to 6 characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted when counting of the count which transmitted data with the communication device of a transmitting side is carried out and the transmitted count becomes the predetermined count of criteria from a transmitting side.
[Claim 8] When the retransmission-of-message requested data with which retransmission-of-message requested data was transmitted to two or more communication devices from the communication device of the 1st receiving side, and the communication device of the 2nd receiving side was transmitted from the communication device of the 1st receiving side is received The broadcast approach according to claim 1 to 7 characterized by making it not transmit the retransmission-of-message requested data to the transmit data as the transmit data which is demanding resending with the same communication device of the 1st receiving side.
[Claim 9] Transmit the data of the same contents to two or more communication devices of a receiving side, and it

detects whether the communication device of a receiving side received normally. In the broadcast equipment which receives the retransmission-of-message requested data which is transmitted from the communication device of a receiving side, and which is required as carrying out re-degree transmission when there are data which have not been received normally Broadcast equipment characterized by having the means which carries out multiple-times transmission of the transmit data which has the same information with a predetermined time interval to the communication device of a receiving side.

[Claim 10] Broadcast equipment according to claim 9 characterized by having a means to extend the time interval which transmits transmit data when retransmission-of-message requested data is received.

[Claim 11] Broadcast equipment according to claim 10 characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted when the time interval which transmits transmit data by extending the time interval which transmits transmit data becomes longer than the time amount set up beforehand.

[Claim 12] Broadcast equipment according to claim 9 to 11 characterized by having the means to which the count which transmits the transmit data which has the same information is made to increase when retransmission-of-message requested data is received.

[Claim 13] Broadcast equipment according to claim 12 characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted when the count which transmits transmit data by making the count which transmits transmit data increase increases more than the count set up beforehand.

[Claim 14] Broadcast equipment according to claim 9 to 13 characterized by having a means to reduce the count which transmits the transmit data which has the same information when retransmission-of-message requested data is not received, by the time a means to clock time amount from a predetermined time, and the clocked time amount reach the predetermined conventional time.

[Claim 15] Broadcast equipment according to claim 9 to 14 characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted when the means which carries out counting of the count which transmitted data, and the transmitted count become the predetermined count of criteria.

[Claim 16] It detects whether the transmit data transmitted to two or more communication devices of a receiving side from one communication device of a transmitting side was received normally. In the broadcast equipment which transmits the retransmission-of-message requested data required as transmitting again when there is transmit data which has not been received normally When multiple-times reception of the transmit data which has the same information is carried out, it has not received normally once and the retransmission-of-message requested data transmitted from a means to transmit retransmission-of-message requested data to two or more communication devices, and the communication device of a receiving side is received Broadcast equipment characterized by having a means to make it not transmit the retransmission-of-message requested data to the same transmit data as the transmit data which the received retransmission-of-message requested data is demanding.

[Claim 17] The data of the same contents are made to transmit to a computer to two or more communication devices of a receiving side. When there are data which detect whether it received normally and have not been normally received with the communication device of a receiving side In the record medium in which reading by the computer which has recorded the program which makes the retransmission-of-message requested data which is transmitted from the communication device of a receiving side, and which is required as carrying out re-degree transmission receive is possible The record medium in which reading by the computer characterized by including a program code means to carry out multiple-times transmission of the transmit data which has the same information with a predetermined time interval to the communication device of a transmission place in a computer is possible.

[Claim 18]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the record medium with which the broadcast equipment for enforcing the broadcast approach which transmits and receives data among two or more communication devices connected by the communication line, for example, two or more computers, or among two or more sets of a server computer (henceforth a server) and printers, and its approach, and the computer program of broadcast are recorded.
[0002]
[Description of the Prior Art] Communication devices, such as two or more computers and a printer, are connected to a communication line, and the correspondence procedure used for the broadcast (broadcast message) which transmits the data of the same contents to two or more communication devices which are receiving sides at coincidence from one communication device which is a transmitting side can be classified into two kinds. The 1st correspondence procedure is only a correspondence procedure which transmits data to a receiving side (printer) from a transmitting side (server), and the 2nd correspondence procedure is a correspondence procedure which processes the recovery Request to Send which requires transmission of data again from a receiving side (printer), when abnormalities, such as lack, are in the data which the receiving side (printer) received, in order to guarantee the transmitted data.
[0003]
[Problem(s) to be Solved by the Invention] In the 1st conventional correspondence procedure, in order that there may be no guarantee at the time of the abnormalities in data, there is a problem that sufficient dependability is not acquired to data communication.
[0004] Moreover, when transmitting the same data to the printer installed in each part store in the 2nd conventional correspondence procedure at coincidence When abnormalities, such as lack of data, occur in many receiving sides (printer) A recovery Request to Send is sent from each receiving side (printer) to all communication devices, and resending data are transmitted as recovery transmission to all communication devices about the recovery Request to Send from each receiving side (printer) in a transmitting side (server). For this reason, the broadcast storm to which the traffic of a communication line increases rapidly occurs, and there is a problem that the throughput as the whole falls for the problem of being in the condition that a normal communication link cannot be performed, and the load of a transmitting side (server). When transmitting data especially with the large size of an image etc., these problems appear notably.
[0005] It is in offering the record medium with which this invention is made in view of this situation, and the broadcast equipment for enforcing the broadcast approach of suppressing generating of a broadcast storm by carrying out predetermined number transmission of the data for transmission which the 1st purpose is a predetermined time interval and have the same information, maintaining a good communication link condition, and preventing the fall of a throughput, and its approach, and the computer program of broadcast are recorded.
[0006] When a recovery Request to Send is received by the transmitting side, the 2nd purpose extends the time interval which transmits the data for transmission, and receives many recovery Requests to Send further. When the time interval which transmits data becomes longer than the upper limit time amount set up beforehand, by making it not transmit a recovery Request to Send A good communication link condition is maintained and it is in offering the record medium with which the broadcast equipment for enforcing the broadcast approach which gives priority to

reservation of a throughput, and its approach, and the computer program of broadcast are recorded.

[0007] The 3rd purpose checks the receiving situation of a recovery Request to Send by the transmitting side, and the number which transmits the transmit data which has the same information is adjusted. Furthermore, by receiving many recovery Requests to Send, and making it not transmit a recovery Request to Send, when the number which transmits the transmit data which has the same information increases more than the upper limit number set up beforehand A good communication link condition is maintained and it is in offering the record medium with which the broadcast equipment for enforcing the broadcast approach which gives priority to reservation of a throughput, and its approach, and the computer program of broadcast are recorded.

[0008] The 4th purpose is by making it not require the recovery transmission about the transmit data received by the receiving side before it to offer the record medium with which the broadcast equipment for enforcing the broadcast approach which gives priority to reservation of a throughput, and its approach, and the computer program of broadcast are recorded, when the count of transmission becomes the count of criteria.

[0009] The 5th purpose is by making it not require the recovery transmission to the same transmit data to offer the record medium with which the broadcast equipment for enforcing the broadcast approach of suppressing generating of a broadcast storm, and its approach, and the computer program of broadcast are recorded, when the communication device of the 2nd receiving side receives the recovery Request to Send which transmitted to two or more communication devices from the communication device of the 1st receiving side.

[0010]

[Means for Solving the Problem] The broadcast approach concerning the 1st invention transmits the data of the same contents to two or more communication devices of a receiving side from one communication device of a transmitting side. In the broadcast approach of transmitting the data required as transmitting again when there are data which detect whether it having received normally and have not been normally received with the communication device of a receiving side from the communication device of a receiving side Multiple-times transmission of the transmit data which has the same information from the communication device of a transmitting side with a predetermined time interval to the communication device of a receiving side is carried out. When the transmit data which has the same information with the communication device of a receiving side has not received normally once, it is characterized by transmitting the retransmission-of-message requested data required as transmitting again from the communication device of a receiving side.

[0011] In the 1st invention, the broadcast approach concerning the 2nd invention is characterized by extending the time interval which transmits transmit data, when the communication device of a transmitting side receives retransmission-of-message requested data.

[0012] In the 2nd invention, the broadcast approach concerning the 3rd invention is characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side, when the time interval which transmits transmit data by extending the time interval which transmits transmit data becomes longer than the time amount set up beforehand.

[0013] In either the 1st invention thru/or the 3rd invention, the broadcast approach concerning the 4th invention is characterized by making the count which transmits the transmit data which has the same information increase, when the communication device of a transmitting side receives retransmission-of-message requested data.

[0014] In the 4th invention, the broadcast approach concerning the 5th invention is characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side, when the count which transmits transmit data by making the count which transmits transmit data increase increases more than the count set up beforehand.

[0015] In either the 1st invention thru/or the 5th invention, the broadcast approach concerning the 6th invention is characterized by reducing the count which transmits the transmit data which has the same information, when retransmission-of-message requested data is not received, by the time the time amount which clocked and clocked time amount reaches the predetermined conventional time from a predetermined time with the communication device of a transmitting side.

[0016] In either the 1st invention thru/or the 6th invention, the broadcast approach concerning the 7th invention is characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side, when counting of the count which transmitted data with the communication device of a transmitting

side is carried out and the transmitted count becomes the predetermined count of criteria.

[0017] The broadcast approach concerning the 8th invention is set to either the 1st invention thru/or the 7th invention. When the retransmission-of-message requested data with which retransmission-of-message requested data was transmitted to two or more communication devices from the communication device of the 1st receiving side, and the communication device of the 2nd receiving side was transmitted from the communication device of the 1st receiving side is received The communication device of the 1st receiving side is characterized by making it not transmit the retransmission-of-message requested data to the same transmit data as the transmit data which is demanding resending.

[0018] The broadcast equipment concerning the 9th invention transmits the data of the same contents to two or more communication devices of a receiving side. In the broadcast equipment which receives the retransmission-of-message requested data which is transmitted from the communication device of a receiving side, and which is required as carrying out re-degree transmission when there are data which detect whether it received normally and have not been normally received with the communication device of a receiving side It is characterized by having the means which carries out multiple-times transmission of the transmit data which has the same information with a predetermined time interval to the communication device of a receiving side.

[0019] In the 9th invention, the broadcast equipment concerning the 10th invention is characterized by having a means to extend the time interval which transmits transmit data, when retransmission-of-message requested data is received.

[0020] The broadcast equipment concerning the 11th invention is characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted, when the time interval which transmits transmit data by extending the time interval which transmits transmit data in the 10th invention becomes longer than the time amount set up beforehand.

[0021] In either the 9th invention thru/or the 11th invention, the broadcast equipment concerning the 12th invention is characterized by having the means to which the count which transmits the transmit data which has the same information is made to increase, when retransmission-of-message requested data is received.

[0022] The broadcast equipment concerning the 13th invention is characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted, when the count which transmits transmit data by making the count which transmits transmit data increase in the 12th invention increases more than the count set up beforehand.

[0023] The broadcast equipment concerning the 14th invention is characterized by having a means to reduce the count which transmits the transmit data which has the same information, when retransmission-of-message requested data is not received, by the time a means to clock time amount from a predetermined time, and the clocked time amount reach the predetermined conventional time in either the 9th invention thru/or the 13th invention.

[0024] In either the 9th invention thru/or the 14th invention, the broadcast equipment concerning the 15th invention is characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted, when the means which carries out counting of the count which transmitted data, and the transmitted count become the predetermined count of criteria.

[0025] It detects whether the broadcast equipment concerning the 16th invention received normally the transmit data transmitted to two or more communication devices of a receiving side from one communication device of a transmitting side. In the broadcast equipment which transmits the retransmission-of-message requested data required as transmitting again when there is transmit data which has not been received normally When multiple-times reception of the transmit data which has the same information is carried out, it has not received normally once and the retransmission-of-message requested data transmitted from a means to transmit retransmission-of-message requested data to two or more communication devices, and the communication device of a receiving side is received It is characterized by having a means to make it not transmit the retransmission-of-message requested data to the same transmit data as the transmit data which the received retransmission-of-message requested data is demanding.

[0026] The record medium in which reading by the computer concerning the 17th invention is possible The data of the same contents are made to transmit to a computer to two or more communication devices of a receiving side. When there are data which detect whether it received normally and have not been normally received with the communication device of a receiving side In the record medium in which reading by the computer which has recorded the program which makes the retransmission-of-message requested data which is transmitted from the communication device of a

receiving side, and which is required as carrying out re-degree transmission receive is possible It is characterized by including a program code means to carry out multiple-times transmission of the transmit data which has the same information with a predetermined time interval to the communication device of a transmission place in a computer.

[0027] In the 17th invention, the record medium in which reading by the computer concerning the 18th invention is possible is characterized by including a means to make the time interval which transmits transmit data extend, when retransmission-of-message requested data is received to a computer.

[0028] The record medium in which reading by the computer concerning the 19th invention is possible is characterized by including the means made to notify to a transmission place that retransmission-of-message requested data is not transmitted, when the time interval which transmits transmit data by extending the time interval which transmits transmit data to a computer in the 18th invention becomes longer than the time amount set up beforehand.

[0029] In either the 17th invention thru/or the 19th invention, the record medium in which reading by the computer concerning the 20th invention is possible is characterized by including the means to which the count which transmits the transmit data which has the same information is made to increase, when retransmission-of-message requested data is received to a computer.

[0030] The record medium in which reading by the computer concerning the 21st invention is possible is characterized by including the means made to notify to a transmission place that retransmission-of-message requested data is not transmitted, when the count which transmits transmit data by making the count which transmits transmit data to a computer increase in the 20th invention increases more than the count set up beforehand.

[0031] The record medium in which reading by the computer concerning the 22nd invention is possible is characterized by to include a means reduce the count which transmits the transmit data which has the same information in them in either the 17th invention thru/or the 21st invention, when retransmission-of-message requested data is not received to a means to make a computer clock time amount from predetermined timing, and a computer, by the time the clocked time amount reaches the conventional time.

[0032] The record medium in which reading by the computer concerning the 23rd invention is possible is characterized by including the means to which counting of the count which transmitted data to the computer is carried out, and the means made to notify to a transmission place that retransmission-of-message requested data is not transmitted when the count which transmitted to the computer becomes the count of criteria in either the 17th invention thru/or the 22nd invention.

[0033] The record medium in which reading by the computer concerning the 24th invention is possible Data are made to receive from the communication device of the transmitting side which transmits the data of the same contents to a computer to two or more communication devices of a receiving side. When there are data which are made to detect and have not been received normally, whether it received normally In the record medium in which reading by the computer which has recorded the program for making the retransmission-of-message requested data required as transmitting again transmit is possible A program code means to make retransmission-of-message requested data transmit to two or more communication devices when multiple-times reception of the transmit data which has the same information is carried out and it has not received normally once to a computer, When the retransmission-of-message requested data transmitted to the computer from the communication device of a receiving side is received, it is characterized by including the program code means to which make it not make the retransmission-of-message requested data to the same transmit data as the transmit data which the received retransmission-of-message requested data is demanding transmit.

[0034] This inventions are the broadcast approach which transmits and receives the data carried out in the environment which connected communication devices, such as two or more computers and a printer, to the communication line, the broadcast equipment used for operation of the approach, and a record medium with which the program which a computer is carried out [program] and makes other communication devices and data transmit and receive is recorded.

[0035] Either of the data which the receiving side received should just be normal data by carrying out count transmission of predetermined of the data for transmission which have the same information with a predetermined time interval in the 1st, 9th, and 17th invention. The purpose that this maintains a good communication link condition can be attained.

[0036] In the 2nd, 3rd, 10th, 11th, 18th, and 19th invention, when a recovery Request to Send is received by the

transmitting side, by lengthening spacing which transmits the data for transmission, a communication link concentrates on short time amount, and it can prevent that a communication link condition will be in the condition which is not good. Furthermore, a communication link condition receives many recovery Requests to Send bad, and when spacing which transmits data becomes longer than the time interval set up beforehand, as a recovery Request to Send cannot be transmitted, generating of a broadcast storm can be suppressed, and priority can be given to reservation of a throughput.

[0037] When a transmitting side receives a recovery Request to Send in the 4th, 5th, 12th, 13th, 20th, and 21st invention, by increasing the count of transmission of the transmit data which has the same information, a receiving side lowers further possibility that no data will be normally unreceivable, suppresses the need for recovery transmission, and can prevent that a communication link condition will be in the condition which is not good. Furthermore, a communication link condition receives many recovery Requests to Send bad, and when the count of transmission of the transmit data which has the same information increases more than the count set up beforehand, as a recovery Request to Send cannot be transmitted, generating of a broadcast storm can be suppressed, and priority can be given to reservation of a throughput.

[0038] In the 6th, 14th, and 22nd invention, it can prevent that the traffic of a communication line is crowded with transmitting sides by reducing the count of transmission of the transmit data which has the same information when a recovery Request to Send is not received more than the conventional time.

[0039] In the 7th, 15th, and 23rd invention, when the count of transmission becomes the count of criteria, priority can be given to reservation of a throughput by making it not require the recovery transmission about the transmit data received by the receiving side before it.

[0040] In the 8th, 16th, and 24th invention, when the communication device which is a receiving side receives the recovery Request to Send sent from the communication device which are other receiving sides, generating of a broadcast storm can be suppressed by making it not require the recovery transmission to the same transmit data.

[0041]

[Embodiment of the Invention] This invention is explained in full detail based on the drawing in which the gestalt of the operation is shown below gestalt 1. of operation. Drawing 1 is the block diagram showing the gestalt of the operation which used the broadcast equipment of this invention. 1 in drawing and 1 -- is a computer used as a communication device, and a computer 1 and 1 -- have CPU2. The program of RAM3 which memorizes the data generated in CPU2, and this invention is recorded on CPU2. With the external storage 4, such as a CD-ROM drive which reads the program of this invention in the record media 10, such as a certain CD-ROM and a flexible disk, and a flexible disk drive, and external storage 4 the time check which clocks the recording apparatus 5, such as a hard disk which stores the program of read this invention, and time amount -- the output units 9, such as a monitor and a printer, are connected to the input units 8, such as the communication link interface 7 which performs transmission and reception of equipment 6, the exterior, and data, a keyboard, and a mouse, and a list. And a computer 1 and 1 -- are connected to the communication line 11 by the communication link interface 7. Furthermore, the communication line 11 is connected to the external network circuits 13, such as the Internet, by the contacts 12, such as a router.

[0042] Also besides reading in a record medium 10, it can connect with the external server computer 14 through the external network circuit 13, and the program of this invention can be stored in a recording device 5 by downloading the program of this invention to a computer 1 from the record medium 15 which has recorded the program of this invention built in the external server computer 14.

[0043] Next, the broadcast approach of this invention is explained. Drawing 2 (a), (b), and drawing 4 are the flow chart which shows the broadcast approach of the computer of the transmitting side in this invention, and the flow chart of the broadcast approach of the computer of a receiving side [in / to a list / in drawing 3 / this invention]. In the computer which is the communication device of a transmitting side, in order to transmit the division data which read the former data which are data to transmit into the field of the address with which it continued on RAM3, and divided former data into n pieces m times, m transmission buffers which write in the transmit data transmitted as a packet are generated (step S101).

[0044] Transmit data creation processing which writes in information, such as the contents of the address data in which the address with which the count data of transmission in which it is shown the what time transmission of the same division data it is, the attribute data in which the attribute of transmit data is shown, and the division data to

transmit are read into the transmission buffer is shown, and division data, is performed (step S102). In the first phase, data1 which is the 1st division data is written in the transmission buffer for transmission which is the 1st time. And it transmits to two or more communication devices of a receiving side at coincidence by making the contents of the transmission buffer which wrote in the transmit data to transmit into a packet (step S103).

[0045] A resending routine is started (step S104), the resending spacing t1 beforehand set up as a time interval which resends the same division data is clocked (step S105), transmit data creation processing which writes the same division data in the transmission buffer for the next transmission is performed (step S106), and the contents of the transmission buffer are transmitted (step S107). In this phase, data1 which is the 1st division data is written in the transmission buffer for transmission which is the 2nd time, and is transmitted to two or more receiving sides as a packet. processing of steps S105-S107 -- ********** (m-1) -- (step S106) and the m same division data will be created by things, and it will transmit m times at spacing of t1.

[0046] Moreover, after data1 is transmitted in step S103, the transmitting spacing t2 beforehand set up as a time interval which transmits each division data is clocked (step S109). data1, data2, --, the 1st transmission of datan which are (step S110) and division data are performed at spacing of t2 by repeating until it transmits datan which is the last division data about processing of steps S102, S103, and S104. And also about data2 - datan, by m resending routines of steps S105-S108, it creates and transmits to two or more receiving sides m times at spacing of t1. In addition, by adjusting t1 and t2, the time amount and transmitting sequence which resending and transmission of division data take can be changed into arbitration.

[0047] When it becomes clear that the packet which received by receiving a packet (step S121) and distinguishing the attribute data of a packet by computer which is the communication device of a receiving side is a packet transmitted from the transmitting side, based on the information currently written in the packet which received, data restoration processing which restores former data from division data is performed (step S122), and the address data of the packet which received are kept as address information.

[0048] Moreover, when the attribute data of the packet which received is data in which recovery Request-to-Send refusal is shown (step S123), the successive state of the address of the division data which searched address information and were received detects and there is a not continuous part, recovery Request-to-Send prohibition processing of making it not transmit the recovery Request to Send of division data which received before the packet concerned by writing dummy data in a not continuous part performs (step S124).

[0049] And the count data of transmission currently written in the packet which received are distinguished. When it becomes clear that the packet which received is the transmit end of the same division data (step S125), The successive state of the address of the division data which searched address information and were received is detected. When there is a not continuous part, the recovery Request to Send which requires retransmission of message of (step S126) and the division data of a not continuous part is generated, and it transmits as a packet (step S127). The recovery Request to Send generated at this time is the same format as transmit data, and the address of the sign which shows that it is a recovery Request to Send to attribute data, and the division data which require recovery transmission of address data is written in.

[0050] Thus, processing of steps S121-S128 is repeated, and data restoration processing is performed. However, when multiple-times reception of the packet in which the same division data were written is carried out, it updates by the contents of the data which received the applicable part of the restored data later.

[0051] And when the packet in which datan which is the last division data was written is received (step S128), it judges that reception of all packets was completed and reception is terminated. In addition, data1 and datan can make a receiving side recognize that they are the 1st division data or the last data by writing in the sign which shows that they are the 1st division data or the last data to attribute data in a transmitting side.

[0052] When it becomes clear that it is the recovery Request to Send to which the packet which received by receiving a packet and distinguishing the attribute data of a packet in a transmitting side was transmitted from the receiving side, one recovery transmission buffer which writes in the recovery transmit data transmitted as a packet is generated (step S131), and recovery transmit data is written in the generated recovery transmission buffer (step S132). Recovery transmit data is a thing based on the contents of the recovery Request to Send which received, is the same format as transmit data, and writes the address of the division data which carry out recovery transmission, and the contents of division data which carry out recovery transmission in the sign which shows that it is recovery transmit data to

attribute data, and address data.

[0053] And the packet of the contents of the recovery transmission buffer which wrote in the recovery transmit data which carries out recovery transmission is carried out, and it transmits to a receiving side once (step S133). In addition, priority is given to the processing about these recovery transmission over the usual transmission shown at steps S101-S110.

[0054] As mentioned above, from a transmitting side, the broadcast approach of this invention transmits the same data m times, and in a receiving side, when it is not able to receive once the packet which has the same data normally, it is an approach of requiring recovery transmission.

[0055] Moreover, as mentioned above, the broadcast approach of this invention can be enforced, not only the communication link between computers but when transmitting the data for printing to two or more printers which are receiving sets from the server which is a sending set.

[0056] Gestalt 2. drawing 5 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 2 of operation of this invention. The gestalt 2 of operation is a thing which was beforehand set up in the resending spacing t1 and extends by extended time amount, and sets to T1 (step S202), and it is made for transmission not to concentrate for a short time, whenever it carries out the partial change of the program of the transmitting side in the gestalt 1 of operation and the computer which is the communication device of a transmitting side receives a recovery Request to Send (step S201). Furthermore, the computer which reception of a recovery Request to Send occurs frequently, performs processing which writes in (step S203) and the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits next from a transmitting side when T1 becomes longer than the upper limit time amount set up beforehand (step S204), and is used as a communication device of a receiving side is the broadcast approach it was made not to transmit a recovery Request to Send. In addition, not the resending spacing t1 but the transmitting spacing t2 may be extended.

[0057] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0058] Gestalt 3. drawing 6 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 3 of operation of this invention. The gestalt 3 of operation carries out the partial change of the program of the transmitting side in the gestalt 1 of operation. Each time when the computer which is the communication device of a transmitting side receives a recovery Request to Send (step S301), It is made to increase by the count of an increment, is referred to as M (step S302), and is made for all the packets that have the same division data in the computer which was beforehand set up in the count m which broadcasts the same division data again, and which is used as a receiving-side communication device to lower further possibility that it is unreceivable to normal. Moreover, it is the broadcast approach by which reception of a recovery Request to Send occurs frequently, perform processing which writes in (step S303) and the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits next from a transmitting side when it increases more than the count of an upper limit to which M was set beforehand (step S304), and it was made for a receiving side not to transmit a recovery Request to Send.

[0059] In addition, when the gestalt 2 of operation and the gestalt 3 of operation are compounded, the upper limit to T1xM is set up and this upper limit is exceeded, it may be made to perform processing which writes in the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits from a transmitting side next, and, thereby, the same effectiveness as the gestalt 2 of operation or the gestalt 3 of operation can be acquired.

[0060] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0061] Gestalt 4. drawing 7 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 4 of operation of this invention. The gestalt 4 of operation carries out the partial change of the program of the transmitting side in the gestalt 1 of operation, and clocks the predetermined monitor time amount t3 from the time of transmitting initiation in the computer which is the communication device of a transmitting side (step S401). And by the time the time check of t3 is completed, when (step S403) and a transmitting side will not receive a recovery Request to Send (step S402), it is the broadcast

approach which was beforehand set up in the count m which broadcasts the same division data again and which decreases by the count of reduction, sets to m1 (step S404), and controls unnecessary transmission. However, it is made not to reduce m1 below to the count of a minimum set up beforehand.

[0062] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0063] Gestalt 5. drawing 8 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 5 of operation of this invention. In the computer which the gestalt 5 of operation carries out the partial change of the program of the transmitting side in the gestalt 1 of operation, and is the communication device of a transmitting side Form the count counter of transmission and counting of the count which transmitted the packet is carried out (step S501). Whenever the count of transmission becomes a predetermined count, processing which writes in the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits from a transmitting side next is performed (step S502). The computer used as a communication device of a receiving side is the synchronous transmission approach it was made not to transmit a recovery Request to Send.

[0064] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0065] Gestalt 6. drawing 9 (a) of operation and (b) are flow charts which show the broadcast approach of the computer of the receiving side explaining the broadcast approach in the gestalt 6 of operation of this invention. When the gestalt 6 of operation carries out the partial change of the program of the receiving side in the gestalt 1 of operation and the computer which is the communication device of a receiving side receives a packet, the attribute data of the packet which received is distinguished, and the packet which received memorizes the address of the division data of which recovery transmission is demanded as lack address receipt information, when it becomes clear that it is the recovery Request to Send transmitted from the communication device of other receiving sides (step S601).

[0066] and when the successive state of the address of the division data which searched address information and were received in step S128 of the gestalt 1 of operation is detected and there is a not continuous part The address of the discontinuity part of address information is compared with the address memorized as lack address receipt information (step S602). When the address of the discontinuity part of address information is not included to the address memorized as lack address receipt information, a recovery Request to Send is transmitted (step S603), and when contained, it is the synchronous transmission approach it was made not to transmit a recovery Request to Send. In addition, when the packet in which the sign which shows recovery Request-to-Send refusal to attribute data is written is received, lack address receipt information is eliminated.

[0067] Since other important section configurations and actuation are the same as the important section configuration and actuation which were explained with the gestalt 1 of above-mentioned operation, explanation is omitted.
[0068]
[Effect of the Invention] By carrying out count transmission of predetermined of the data for transmission which have the same information with a predetermined time interval by this invention as explained in full detail above Possibility of saying that normal data are not obtained by abnormalities, such as lack of data, either of the data which the receiving side received being [therefore] just normal data is low. Since the frequency where the recovery transmission which transmits again the data which abnormalities generated is required also becomes low and it is hard to generate a broadcast storm, the outstanding effectiveness is done so -- a good communication link condition can be maintained and the fall of a throughput can be prevented.

[0069] Moreover, in this invention, when a recovery Request to Send is received by the transmitting side, by lengthening spacing which transmits the data for transmission, a communication link concentrates on short time amount, and it can prevent that a communication link condition will be in the condition which is not good. Furthermore, the outstanding effectiveness is done so -- a communication link condition receives many recovery Requests to Send bad, and when spacing which transmits data becomes longer than the time interval set up beforehand, as a recovery Request to Send cannot be transmitted, generating of a broadcast storm can be suppressed, and priority can be given to reservation of a throughput.

[0070] Furthermore, when a transmitting side receives a recovery Request to Send in this invention, by increasing the count of transmission of the transmit data which has the same information, possibility that all data will be unreceivable in a receiving side with a normal condition is lowered further, the need for recovery transmission is suppressed, and it can prevent that a communication link condition will be in the condition which is not good. Furthermore, a communication link condition receives many recovery Requests to Send bad, when the count of transmission of the transmit data which has the same information increases more than the count set up beforehand, as a recovery Request to Send is not transmitted, generating of a broadcast storm is suppressed, and the outstanding effectiveness is done so -- priority can be given to reservation of a throughput.

[0071] Furthermore, by this invention, the outstanding effectiveness -- it can prevent that the traffic of a communication line is crowded by reducing the count of transmission of the transmit data which has the information that it is the same when a recovery Request to Send is not received more than the conventional time -- is done so by the transmitting side.

[0072] Furthermore, in this invention, when the count of transmission becomes the count of criteria, the outstanding effectiveness is done so by making it not require the recovery transmission about the transmit data received by the receiving side before it -- priority can be given to reservation of a throughput.

[0073] Furthermore, the outstanding effectiveness -- generating of a broadcast storm can be suppressed by making it not require the recovery transmission to the same transmit data, when the communication device which is a receiving side receives the recovery Request to Send sent from the communication device which are other receiving sides in this invention -- is done so.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] This invention relates to the record medium with which the broadcast equipment for enforcing the broadcast approach which transmits and receives data among two or more communication devices connected by the communication line, for example, two or more computers, or among two or more sets of a server computer (henceforth a server) and printers, and its approach, and the computer program of broadcast are recorded.

[Translation done.]

PRIOR ART

[Description of the Prior Art] Communication devices, such as two or more computers and a printer, are connected to a communication line, and the correspondence procedure used for the broadcast (broadcast message) which transmits the data of the same contents to two or more communication devices which are receiving sides at coincidence from one communication device which is a transmitting side can be classified into two kinds. The 1st correspondence procedure is only a correspondence procedure which transmits data to a receiving side (printer) from a transmitting side (server), and the 2nd correspondence procedure is a correspondence procedure which processes the recovery Request to Send which requires transmission of data again from a receiving side (printer), when abnormalities, such as lack, are in the data which the receiving side (printer) received, in order to guarantee the transmitted data.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] By carrying out count transmission of predetermined of the data for transmission which have the same information with a predetermined time interval by this invention as explained in full detail above Possibility of saying that normal data are not obtained by abnormalities, such as lack of data, either of the data which the receiving side received being [therefore] just normal data is low. Since the frequency where the recovery transmission which transmits again the data which abnormalities generated is required also becomes low and it is hard to generate a broadcast storm, the outstanding effectiveness is done so -- a good communication link condition can be maintained and the fall of a throughput can be prevented.

[0069] Moreover, in this invention, when a recovery Request to Send is received by the transmitting side, by lengthening spacing which transmits the data for transmission, a communication link concentrates on short time amount, and it can prevent that a communication link condition will be in the condition which is not good. Furthermore, the outstanding effectiveness is done so -- a communication link condition receives many recovery Requests to Send bad, and when spacing which transmits data becomes longer than the time interval set up beforehand, as a recovery Request to Send cannot be transmitted, generating of a broadcast storm can be suppressed, and priority can be given to reservation of a throughput.

[0070] Furthermore, when a transmitting side receives a recovery Request to Send in this invention, by increasing the count of transmission of the transmit data which has the same information, possibility that all data will be unreceivable in a receiving side with a normal condition is lowered further, the need for recovery transmission is suppressed, and it can prevent that a communication link condition will be in the condition which is not good. Furthermore, a communication link condition receives many recovery Requests to Send bad, when the count of transmission of the transmit data which has the same information increases more than the count set up beforehand, as a recovery Request to Send is not transmitted, generating of a broadcast storm is suppressed, and the outstanding effectiveness is done so -- priority can be given to reservation of a throughput.

[0071] Furthermore, by this invention, the outstanding effectiveness -- it can prevent that the traffic of a communication line is crowded by reducing the count of transmission of the transmit data which has the information that it is the same when a recovery Request to Send is not received more than the conventional time -- is done so by the transmitting side.

[0072] Furthermore, in this invention, when the count of transmission becomes the count of criteria, the outstanding effectiveness is done so by making it not require the recovery transmission about the transmit data received by the receiving side before it -- priority can be given to reservation of a throughput.

[0073] Furthermore, the outstanding effectiveness -- generating of a broadcast storm can be suppressed by making it not require the recovery transmission to the same transmit data, when the communication device which is a receiving side receives the recovery Request to Send sent from the communication device which are other receiving sides in this invention -- is done so.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In the 1st conventional correspondence procedure, in order that there may be no guarantee at the time of the abnormalities in data, there is a problem that sufficient dependability is not acquired to data communication.

[0004] Moreover, when transmitting the same data to the printer installed in each part store in the 2nd conventional correspondence procedure at coincidence When abnormalities, such as lack of data, occur in many receiving sides (printer) A recovery Request to Send is sent from each receiving side (printer) to all communication devices, and resending data are transmitted as recovery transmission to all communication devices about the recovery Request to Send from each receiving side (printer) in a transmitting side (server). For this reason, the broadcast storm to which the traffic of a communication line increases rapidly occurs, and there is a problem that the throughput as the whole falls for the problem of being in the condition that a normal communication link cannot be performed, and the load of a transmitting side (server). When transmitting data especially with the large size of an image etc., these problems appear notably.

[0005] It is in offering the record medium with which this invention is made in view of this situation, and the broadcast equipment for enforcing the broadcast approach of suppressing generating of a broadcast storm by carrying out predetermined number transmission of the data for transmission which the 1st purpose is a predetermined time interval and have the same information, maintaining a good communication link condition, and preventing the fall of a throughput, and its approach, and the computer program of broadcast are recorded.

[0006] When a recovery Request to Send is received by the transmitting side, the 2nd purpose extends the time interval which transmits the data for transmission, and receives many recovery Requests to Send further. When the time interval which transmits data becomes longer than the upper limit time amount set up beforehand, by making it not transmit a recovery Request to Send A good communication link condition is maintained and it is in offering the record medium with which the broadcast equipment for enforcing the broadcast approach which gives priority to reservation of a throughput, and its approach, and the computer program of broadcast are recorded.

[0007] The 3rd purpose checks the receiving situation of a recovery Request to Send by the transmitting side, and the number which transmits the transmit data which has the same information is adjusted. Furthermore, by receiving many recovery Requests to Send, and making it not transmit a recovery Request to Send, when the number which transmits the transmit data which has the same information increases more than the upper limit number set up beforehand A good communication link condition is maintained and it is in offering the record medium with which the broadcast equipment for enforcing the broadcast approach which gives priority to reservation of a throughput, and its approach, and the computer program of broadcast are recorded.

[0008] The 4th purpose is by making it not require the recovery transmission about the transmit data received by the receiving side before it to offer the record medium with which the broadcast equipment for enforcing the broadcast approach which gives priority to reservation of a throughput, and its approach, and the computer program of broadcast are recorded, when the count of transmission becomes the count of criteria.

[0009] The 5th purpose is by making it not require the recovery transmission to the same transmit data to offer the record medium with which the broadcast equipment for enforcing the broadcast approach of suppressing generating of a broadcast storm, and its approach, and the computer program of broadcast are recorded, when the communication device of the 2nd receiving side receives the recovery Request to Send which transmitted to two or more

communication devices from the communication device of the 1st receiving side.

[Translation done.]

MEANS

[Means for Solving the Problem] The broadcast approach concerning the 1st invention transmits the data of the same contents to two or more communication devices of a receiving side from one communication device of a transmitting side. In the broadcast approach of transmitting the data required as transmitting again when there are data which detect whether it having received normally and have not been normally received with the communication device of a receiving side from the communication device of a receiving side Multiple-times transmission of the transmit data which has the same information from the communication device of a transmitting side with a predetermined time interval to the communication device of a receiving side is carried out. When the transmit data which has the same information with the communication device of a receiving side has not received normally once, it is characterized by transmitting the retransmission-of-message requested data required as transmitting again from the communication device of a receiving side.

[0011] In the 1st invention, the broadcast approach concerning the 2nd invention is characterized by extending the time interval which transmits transmit data, when the communication device of a transmitting side receives retransmission-of-message requested data.

[0012] In the 2nd invention, the broadcast approach concerning the 3rd invention is characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side, when the time interval which transmits transmit data by extending the time interval which transmits transmit data becomes longer than the time amount set up beforehand.

[0013] In either the 1st invention thru/or the 3rd invention, the broadcast approach concerning the 4th invention is characterized by making the count which transmits the transmit data which has the same information increase, when the communication device of a transmitting side receives retransmission-of-message requested data.

[0014] In the 4th invention, the broadcast approach concerning the 5th invention is characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side, when the count which transmits transmit data by making the count which transmits transmit data increase increases more than the count set up beforehand.

[0015] In either the 1st invention thru/or the 5th invention, the broadcast approach concerning the 6th invention is characterized by reducing the count which transmits the transmit data which has the same information, when retransmission-of-message requested data is not received, by the time the time amount which clocked and clocked time amount reaches the predetermined conventional time from a predetermined time with the communication device of a transmitting side.

[0016] In either the 1st invention thru/or the 6th invention, the broadcast approach concerning the 7th invention is characterized by notifying to a receiving side that retransmission-of-message requested data is not transmitted from a transmitting side, when counting of the count which transmitted data with the communication device of a transmitting side is carried out and the transmitted count becomes the predetermined count of criteria.

[0017] The broadcast approach concerning the 8th invention is set to either the 1st invention thru/or the 7th invention. When the retransmission-of-message requested data with which retransmission-of-message requested data was transmitted to two or more communication devices from the communication device of the 1st receiving side, and the communication device of the 2nd receiving side was transmitted from the communication device of the 1st receiving side is received The communication device of the 1st receiving side is characterized by making it not transmit the

retransmission-of-message requested data to the same transmit data as the transmit data which is demanding resending.

[0018] The broadcast equipment concerning the 9th invention transmits the data of the same contents to two or more communication devices of a receiving side. In the broadcast equipment which receives the retransmission-of-message requested data which is transmitted from the communication device of a receiving side, and which is required as carrying out re-degree transmission when there are data which detect whether it received normally and have not been normally received with the communication device of a receiving side It is characterized by having the means which carries out multiple-times transmission of the transmit data which has the same information with a predetermined time interval to the communication device of a receiving side.

[0019] In the 9th invention, the broadcast equipment concerning the 10th invention is characterized by having a means to extend the time interval which transmits transmit data, when retransmission-of-message requested data is received.

[0020] The broadcast equipment concerning the 11th invention is characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted, when the time interval which transmits transmit data by extending the time interval which transmits transmit data in the 10th invention becomes longer than the time amount set up beforehand.

[0021] In either the 9th invention thru/or the 11th invention, the broadcast equipment concerning the 12th invention is characterized by having the means to which the count which transmits the transmit data which has the same information is made to increase, when retransmission-of-message requested data is received.

[0022] The broadcast equipment concerning the 13th invention is characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted, when the count which transmits transmit data by making the count which transmits transmit data increase in the 12th invention increases more than the count set up beforehand.

[0023] The broadcast equipment concerning the 14th invention is characterized by having a means to reduce the count which transmits the transmit data which has the same information, when retransmission-of-message requested data is not received, by the time a means to clock time amount from a predetermined time, and the clocked time amount reach the predetermined conventional time in either the 9th invention thru/or the 13th invention.

[0024] In either the 9th invention thru/or the 14th invention, the broadcast equipment concerning the 15th invention is characterized by having a means to notify to a receiving side that retransmission-of-message requested data is not transmitted, when the means which carries out counting of the count which transmitted data, and the transmitted count become the predetermined count of criteria.

[0025] It detects whether the broadcast equipment concerning the 16th invention received normally the transmit data transmitted to two or more communication devices of a receiving side from one communication device of a transmitting side. In the broadcast equipment which transmits the retransmission-of-message requested data required as transmitting again when there is transmit data which has not been received normally When multiple-times reception of the transmit data which has the same information is carried out, it has not received normally once and the retransmission-of-message requested data transmitted from a means to transmit retransmission-of-message requested data to two or more communication devices, and the communication device of a receiving side is received It is characterized by having a means to make it not transmit the retransmission-of-message requested data to the same transmit data as the transmit data which the received retransmission-of-message requested data is demanding.

[0026] The record medium in which reading by the computer concerning the 17th invention is possible The data of the same contents are made to transmit to a computer to two or more communication devices of a receiving side. When there are data which detect whether it received normally and have not been normally received with the communication device of a receiving side In the record medium in which reading by the computer which has recorded the program which makes the retransmission-of-message requested data which is transmitted from the communication device of a receiving side, and which is required as carrying out re-degree transmission receive is possible It is characterized by including a program code means to carry out multiple-times transmission of the transmit data which has the same information with a predetermined time interval to the communication device of a transmission place in a computer.

[0027] In the 17th invention, the record medium in which reading by the computer concerning the 18th invention is possible is characterized by including a means to make the time interval which transmits transmit data extend, when retransmission-of-message requested data is received to a computer.

[0028] The record medium in which reading by the computer concerning the 19th invention is possible is characterized by including the means made to notify to a transmission place that retransmission-of-message requested data is not transmitted, when the time interval which transmits transmit data by extending the time interval which transmits transmit data to a computer in the 18th invention becomes longer than the time amount set up beforehand.

[0029] In either the 17th invention thru/or the 19th invention, the record medium in which reading by the computer concerning the 20th invention is possible is characterized by including the means to which the count which transmits the transmit data which has the same information is made to increase, when retransmission-of-message requested data is received to a computer.

[0030] The record medium in which reading by the computer concerning the 21st invention is possible is characterized by including the means made to notify to a transmission place that retransmission-of-message requested data is not transmitted, when the count which transmits transmit data by making the count which transmits transmit data to a computer increase in the 20th invention increases more than the count set up beforehand.

[0031] The record medium in which reading by the computer concerning the 22nd invention is possible is characterized by to include a means reduce the count which transmits the transmit data which has the same information in them in either the 17th invention thru/or the 21st invention, when retransmission-of-message requested data is not received to a means to make a computer clock time amount from predetermined timing, and a computer, by the time the clocked time amount reaches the conventional time.

[0032] The record medium in which reading by the computer concerning the 23rd invention is possible is characterized by including the means to which counting of the count which transmitted data to the computer is carried out, and the means made to notify to a transmission place that retransmission-of-message requested data is not transmitted when the count which transmitted to the computer becomes the count of criteria in either the 17th invention thru/or the 22nd invention.

[0033] The record medium in which reading by the computer concerning the 24th invention is possible Data are made to receive from the communication device of the transmitting side which transmits the data of the same contents to a computer to two or more communication devices of a receiving side. When there are data which are made to detect and have not been received normally, whether it received normally In the record medium in which reading by the computer which has recorded the program for making the retransmission-of-message requested data required as transmitting again transmit is possible A program code means to make retransmission-of-message requested data transmit to two or more communication devices when multiple-times reception of the transmit data which has the same information is carried out and it has not received normally once to a computer, When the retransmission-of-message requested data transmitted to the computer from the communication device of a receiving side is received, it is characterized by including the program code means to which make it not make the retransmission-of-message requested data to the same transmit data as the transmit data which the received retransmission-of-message requested data is demanding transmit.

[0034] This inventions are the broadcast approach which transmits and receives the data carried out in the environment which connected communication devices, such as two or more computers and a printer, to the communication line, the broadcast equipment used for operation of the approach, and a record medium with which the program which a computer is carried out [program] and makes other communication devices and data transmit and receive is recorded.

[0035] Either of the data which the receiving side received should just be normal data by carrying out count transmission of predetermined of the data for transmission which have the same information with a predetermined time interval in the 1st, 9th, and 17th invention. The purpose that this maintains a good communication link condition can be attained.

[0036] In the 2nd, 3rd, 10th, 11th, 18th, and 19th invention, when a recovery Request to Send is received by the transmitting side, by lengthening spacing which transmits the data for transmission, a communication link concentrates on short time amount, and it can prevent that a communication link condition will be in the condition which is not good. Furthermore, a communication link condition receives many recovery Requests to Send bad, and when spacing which transmits data becomes longer than the time interval set up beforehand, as a recovery Request to Send cannot be transmitted, generating of a broadcast storm can be suppressed, and priority can be given to reservation of a throughput.

[0037] When a transmitting side receives a recovery Request to Send in the 4th, 5th, 12th, 13th, 20th, and 21st invention, by increasing the count of transmission of the transmit data which has the same information, a receiving side lowers further possibility that no data will be normally unreceivable, suppresses the need for recovery transmission, and can prevent that a communication link condition will be in the condition which is not good. Furthermore, a communication link condition receives many recovery Requests to Send bad, and when the count of transmission of the transmit data which has the same information increases more than the count set up beforehand, as a recovery Request to Send cannot be transmitted, generating of a broadcast storm can be suppressed, and priority can be given to reservation of a throughput.

[0038] In the 6th, 14th, and 22nd invention, it can prevent that the traffic of a communication line is crowded with transmitting sides by reducing the count of transmission of the transmit data which has the same information when a recovery Request to Send is not received more than the conventional time.

[0039] In the 7th, 15th, and 23rd invention, when the count of transmission becomes the count of criteria, priority can be given to reservation of a throughput by making it not require the recovery transmission about the transmit data received by the receiving side before it.

[0040] In the 8th, 16th, and 24th invention, when the communication device which is a receiving side receives the recovery Request to Send sent from the communication device which are other receiving sides, generating of a broadcast storm can be suppressed by making it not require the recovery transmission to the same transmit data.

[0041]

[Embodiment of the Invention] This invention is explained in full detail based on the drawing in which the gestalt of the operation is shown below gestalt 1. of operation. Drawing 1 is the block diagram showing the gestalt of the operation which used the broadcast equipment of this invention. 1 in drawing and 1 -- is a computer used as a communication device, and a computer 1 and 1 -- have CPU2. The program of RAM3 which memorizes the data generated in CPU2, and this invention is recorded on CPU2. With the external storage 4, such as a CD-ROM drive which reads the program of this invention in the record media 10, such as a certain CD-ROM and a flexible disk, and a flexible disk drive, and external storage 4 the time check which clocks the recording apparatus 5, such as a hard disk which stores the program of read this invention, and time amount -- the output units 9, such as a monitor and a printer, are connected to the input units 8, such as the communication link interface 7 which performs transmission and reception of equipment 6, the exterior, and data, a keyboard, and a mouse, and a list. And a computer 1 and 1 -- are connected to the communication line 11 by the communication link interface 7. Furthermore, the communication line 11 is connected to the external network circuits 13, such as the Internet, by the contacts 12, such as a router.

[0042] Also besides reading in a record medium 10, it can connect with the external server computer 14 through the external network circuit 13, and the program of this invention can be stored in a recording device 5 by downloading the program of this invention to a computer 1 from the record medium 15 which has recorded the program of this invention built in the external server computer 14.

[0043] Next, the broadcast approach of this invention is explained. Drawing 2 (a), (b), and drawing 4 are the flow chart which shows the broadcast approach of the computer of the transmitting side in this invention, and the flow chart of the broadcast approach of the computer of a receiving side [in / to a list / in drawing 3 / this invention]. In the computer which is the communication device of a transmitting side, in order to transmit the division data which read the former data which are data to transmit into the field of the address with which it continued on RAM3, and divided former data into n pieces m times, m transmission buffers which write in the transmit data transmitted as a packet are generated (step S101).

[0044] Transmit data creation processing which writes in information, such as the contents of the address data in which the address with which the count data of transmission in which it is shown the what time transmission of the same division data it is, the attribute data in which the attribute of transmit data is shown, and the division data to transmit are read into the transmission buffer is shown, and division data, is performed (step S102). In the first phase, data1 which is the 1st division data is written in the transmission buffer for transmission which is the 1st time. And it transmits to two or more communication devices of a receiving side at coincidence by making the contents of the transmission buffer which wrote in the transmit data to transmit into a packet (step S103).

[0045] A resending routine is started (step S104), the resending spacing t1 beforehand set up as a time interval which resends the same division data is clocked (step S105), transmit data creation processing which writes the same division

data in the transmission buffer for the next transmission is performed (step S106), and the contents of the transmission buffer are transmitted (step S107). In this phase, data1 which is the 1st division data is written in the transmission buffer for transmission which is the 2nd time, and is transmitted to two or more receiving sides as a packet. processing of steps S105-S107 -- ********** (m-1) -- (step S106) and the m same division data will be created by things, and it will transmit m times at spacing of t1.

[0046] Moreover, after data1 is transmitted in step S103, the transmitting spacing t2 beforehand set up as a time interval which transmits each division data is clocked (step S109). data1, data2, --, the 1st transmission of datan which are (step S110) and division data are performed at spacing of t2 by repeating until it transmits datan which is the last division data about processing of steps S102, S103, and S104. And also about data2 - datan, by m resending routines of steps S105-S108, it creates and transmits to two or more receiving sides m times at spacing of t1. In addition, by adjusting t1 and t2, the time amount and transmitting sequence which resending and transmission of division data take can be changed into arbitration.

[0047] When it becomes clear that the packet which received by receiving a packet (step S121) and distinguishing the attribute data of a packet by computer which is the communication device of a receiving side is a packet transmitted from the transmitting side, based on the information currently written in the packet which received, data restoration processing which restores former data from division data is performed (step S122), and the address data of the packet which received are kept as address information.

[0048] Moreover, when the attribute data of the packet which received is data in which recovery Request-to-Send refusal is shown (step S123), the successive state of the address of the division data which searched address information and were received detects and there is a not continuous part, recovery Request-to-Send prohibition processing of making it not transmit the recovery Request to Send of division data which received before the packet concerned by writing dummy data in a not continuous part performs (step S124).

[0049] And the count data of transmission currently written in the packet which received are distinguished. When it becomes clear that the packet which received is the transmit end of the same division data (step S125), The successive state of the address of the division data which searched address information and were received is detected. When there is a not continuous part, the recovery Request to Send which requires retransmission of message of (step S126) and the division data of a not continuous part is generated, and it transmits as a packet (step S127). The recovery Request to Send generated at this time is the same format as transmit data, and the address of the sign which shows that it is a recovery Request to Send to attribute data, and the division data which require recovery transmission of address data is written in.

[0050] Thus, processing of steps S121-S128 is repeated, and data restoration processing is performed. However, when multiple-times reception of the packet in which the same division data were written is carried out, it updates by the contents of the data which received the applicable part of the restored data later.

[0051] And when the packet in which datan which is the last division data was written is received (step S128), it judges that reception of all packets was completed and reception is terminated. In addition, data1 and datan can make a receiving side recognize that they are the 1st division data or the last data by writing in the sign which shows that they are the 1st division data or the last data to attribute data in a transmitting side.

[0052] When it becomes clear that it is the recovery Request to Send to which the packet which received by receiving a packet and distinguishing the attribute data of a packet in a transmitting side was transmitted from the receiving side, one recovery transmission buffer which writes in the recovery transmit data transmitted as a packet is generated (step S131), and recovery transmit data is written in the generated recovery transmission buffer (step S132). Recovery transmit data is a thing based on the contents of the recovery Request to Send which received, is the same format as transmit data, and writes the address of the division data which carry out recovery transmission, and the contents of division data which carry out recovery transmission in the sign which shows that it is recovery transmit data to attribute data, and address data.

[0053] And the packet of the contents of the recovery transmission buffer which wrote in the recovery transmit data which carries out recovery transmission is carried out, and it transmits to a receiving side once (step S133). In addition, priority is given to the processing about these recovery transmission over the usual transmission shown at steps S101-S110.

[0054] As mentioned above, from a transmitting side, the broadcast approach of this invention transmits the same data

m times, and in a receiving side, when it is not able to receive once the packet which has the same data normally, it is an approach of requiring recovery transmission.

[0055] Moreover, as mentioned above, the broadcast approach of this invention can be enforced, not only the communication link between computers but when transmitting the data for printing to two or more printers which are receiving sets from the server which is a sending set.

[0056] Gestalt 2. drawing 5 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 2 of operation of this invention. The gestalt 2 of operation is a thing which was beforehand set up in the resending spacing t1 and extends by extended time amount, and sets to T1 (step S202), and it is made for transmission not to concentrate for a short time, whenever it carries out the partial change of the program of the transmitting side in the gestalt 1 of operation and the computer which is the communication device of a transmitting side receives a recovery Request to Send (step S201). Furthermore, the computer which reception of a recovery Request to Send occurs frequently, performs processing which writes in (step S203) and the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits next from a transmitting side when T1 becomes longer than the upper limit time amount set up beforehand (step S204), and is used as a communication device of a receiving side is the broadcast approach it was made not to transmit a recovery Request to Send. In addition, not the resending spacing t1 but the transmitting spacing t2 may be extended.

[0057] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0058] Gestalt 3. drawing 6 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 3 of operation of this invention. The gestalt 3 of operation carries out the partial change of the program of the transmitting side in the gestalt 1 of operation. Each time when the computer which is the communication device of a transmitting side receives a recovery Request to Send (step S301), It is made to increase by the count of an increment, is referred to as M (step S302), and is made for all the packets that have the same division data in the computer which was beforehand set up in the count m which broadcasts the same division data again, and which is used as a receiving-side communication device to lower further possibility that it is unreceivable to normal. Moreover, it is the broadcast approach by which reception of a recovery Request to Send occurs frequently, perform processing which writes in (step S303) and the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits next from a transmitting side when it increases more than the count of an upper limit to which M was set beforehand (step S304), and it was made for a receiving side not to transmit a recovery Request to Send.

[0059] In addition, when the gestalt 2 of operation and the gestalt 3 of operation are compounded, the upper limit to T1xM is set up and this upper limit is exceeded, it may be made to perform processing which writes in the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits from a transmitting side next, and, thereby, the same effectiveness as the gestalt 2 of operation or the gestalt 3 of operation can be acquired.

[0060] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0061] Gestalt 4. drawing 7 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 4 of operation of this invention. The gestalt 4 of operation carries out the partial change of the program of the transmitting side in the gestalt 1 of operation, and clocks the predetermined monitor time amount t3 from the time of transmitting initiation in the computer which is the communication device of a transmitting side (step S401). And by the time the time check of t3 is completed, when (step S403) and a transmitting side will not receive a recovery Request to Send (step S402), it is the broadcast approach which was beforehand set up in the count m which broadcasts the same division data again and which decreases by the count of reduction, sets to m1 (step S404), and controls unnecessary transmission. However, it is made not to reduce m1 below to the count of a minimum set up beforehand.

[0062] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0063] Gestalt 5. drawing 8 of operation is a flow chart which shows the broadcast approach of the computer of the transmitting side explaining the broadcast approach in the gestalt 5 of operation of this invention. In the computer which the gestalt 5 of operation carries out the partial change of the program of the transmitting side in the gestalt 1 of operation, and is the communication device of a transmitting side Form the count counter of transmission and counting of the count which transmitted the packet is carried out (step S501). Whenever the count of transmission becomes a predetermined count, processing which writes in the sign which shows recovery Request-to-Send refusal to the attribute data of the packet which transmits from a transmitting side next is performed (step S502). The computer used as a communication device of a receiving side is the synchronous transmission approach it was made not to transmit a recovery Request to Send.

[0064] Since other important section configurations and actuation are the same as the important section configuration of the broadcast approach explained with the gestalt 1 of above-mentioned operation, and actuation, explanation is omitted.

[0065] Gestalt 6. drawing 9 (a) of operation and (b) are flow charts which show the broadcast approach of the computer of the receiving side explaining the broadcast approach in the gestalt 6 of operation of this invention. When the gestalt 6 of operation carries out the partial change of the program of the receiving side in the gestalt 1 of operation and the computer which is the communication device of a receiving side receives a packet, the attribute data of the packet which received is distinguished, and the packet which received memorizes the address of the division data of which recovery transmission is demanded as lack address receipt information, when it becomes clear that it is the recovery Request to Send transmitted from the communication device of other receiving sides (step S601).

[0066] and when the successive state of the address of the division data which searched address information and were received in step S128 of the gestalt 1 of operation is detected and there is a not continuous part The address of the discontinuity part of address information is compared with the address memorized as lack address receipt information (step S602). When the address of the discontinuity part of address information is not included to the address memorized as lack address receipt information, a recovery Request to Send is transmitted (step S603), and when contained, it is the synchronous transmission approach it was made not to transmit a recovery Request to Send. In addition, when the packet in which the sign which shows recovery Request-to-Send refusal to attribute data is written is received, lack address receipt information is eliminated.

[0067] Since other important section configurations and actuation are the same as the important section configuration and actuation which were explained with the gestalt 1 of above-mentioned operation, explanation is omitted.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is a block diagram explaining the gestalt of the operation using the broadcast equipment of this invention.
[Drawing 2] It is the flow chart which shows the broadcast approach of the computer of the transmitting side in the gestalt 1 of operation.
[Drawing 3] It is the flow chart which shows the broadcast approach of the computer of the receiving side in the gestalt 1 of operation.
[Drawing 4] It is the flow chart which shows the broadcast approach of the computer of the transmitting side in the gestalt 1 of operation.
[Drawing 5] It is the flow chart which shows the broadcast approach of the computer of the transmitting side in the gestalt 2 of operation.
[Drawing 6] It is the flow chart which shows the broadcast approach of the computer of the transmitting side in the gestalt 3 of operation.
[Drawing 7] It is the flow chart which shows the broadcast approach of the computer of the transmitting side in the gestalt 4 of operation.
[Drawing 8] It is the flow chart which shows the broadcast approach of the computer of the transmitting side in the gestalt 5 of operation.
[Drawing 9] It is the flow chart which shows the broadcast approach of the computer of the receiving side in the gestalt 6 of operation.
[Description of Notations]
1 Computer
2 CPU
3 RAM
4 External Storage
5 Recording Device
6 Time Check -- Equipment
7 Communication Link Interface
8 Input Unit
9 Output Unit
10 Record Medium
11 Communication Line
12 Contact
13 External Network Circuit
14 External Server Computer
15 Record Medium

[Translation done.]

105 Data Configuration Section
106 Terminal Status Management Section
107 Terminal Engine-Performance Judging Section
200 Network
300 Terminal

[Translation done.]

This Page is Inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

❑ **BLACK BORDERS**

❑ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**

❑ **FADED TEXT OR DRAWING**

☑ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**

❑ **SKEWED/SLANTED IMAGES**

❑ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**

❑ **GRAY SCALE DOCUMENTS**

❑ **LINES OR MARKS ON ORIGINAL DOCUMENT**

❑ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**

❑ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.
As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.